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## Meridian 1

X11 Release 24.0x

### Installation and Maintenance

Book 1 of 2





# Meridian 1

X11 Release 24.0X

## Installation and Maintenance

Book 1 of 2



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AUXILIARY  
SHELVES  
553-3001-570



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Meridian 1

# **Power monitor/common equipment auxiliary shelves**

Description and installation

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## About this document

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This document provides detailed instructions on how to engineer and install the NT7D44 and NT7D45 Power Monitor/Common Equipment (CE) Auxiliary Shelves.

### References

See the *Planning and engineering guide* for

- *Library navigator* (553-3001-000)
- *Meridian 1 system overview* (553-3001-100)
- *Meridian 1 installation planning* (553-3001-120)
- *Meridian 1 system engineering* (553-3001-151)
- *Meridian 1 power engineering* (553-3001-152)
- *Spares planning* (553-3001-153)
- *Meridian 1 equipment identification* (553-3001-154)

See the *Installation and maintenance guide* for

- *Meridian 1 system installation procedures* (553-3001-210)
- *Circuit card installation and testing* (553-3001-211)
- *Telephone and attendant console installation* (553-3001-215)
- *Upgrade system installation* (553-3001-250)
- *Disk drive upgrade procedures* (553-3001-251)
- *Meridian 1 general maintenance information* (553-3001-500)
- *Meridian 1 fault clearing* (553-3001-510)
- *Meridian 1 hardware replacement* (553-3001-520)

See the *X11 software guide* for an overview of software architecture, procedures for software installation and management, and a detailed description of all X11 features and services. This information is contained in two documents:

- *X11 software management* (553-3001-300)
- *X11 features and services* (553-3001-305)

See the *X11 input/output guide* (553-3001-400) for a description of all administration programs, maintenance programs, and system messages.

## General information

The NT7D44 and NT7D45 Power Monitor/CE Auxiliary Shelves provide an alternate shelf location for the 3.5-in. disk drive units required for X11 release 15 and later systems. These shelves can also accommodate Digital Trunk Interface (DTI) or Primary Rate Interface (PRI) cards.

The NT7D44 and NT7D45 Power Monitor/CE Auxiliary Shelves are functionally equivalent; however, the NT7D44 shelf supports cantilever cabinet mounting and the NT7D45 shelf supports center cabinet mounting. Table 1 provides the description and compatibility of each shelf.

**Table 1**  
**Power monitor/CE auxiliary shelves compatibility**

Order code	Description	Compatibility	
		System	Cabinet
NT7D44	Power Monitor/CE Auxiliary Shelf — cantilever mount	NT, XT, 61, or 71	QCA55 or QCA58 (Note 1)
NT7D45	Power Monitor/CE Auxiliary Shelf — center mount	NT, XT, 61, or 71	QCA23 or QCA24 (Note 2)
<p><b>Note 1:</b> The NT7D44 shelf is compatible with QCA55 and QCA58 cabinets that are retained as part of an upgrade to SL-1 NT or XT systems, or to Meridian 1 system options 61 or 71.</p> <p><b>Note 2:</b> The NT7D45 shelf is compatible with QCA23 and QCA24 cabinets that are retained as part of an upgrade to SL-1 NT or XT systems, or to Meridian 1 system options 61 or 71.</p>			



## Physical description

The NT7D44 Power Monitor/CE Auxiliary Shelf is 48.3 cm (19 in.) wide, 35.5 cm (13.96 in.) high, and 28 cm (11 in.) deep, with the cantilever mount wings on both sides of the shelves (see Figure 1).

The NT7D45 Power Monitor/CE Auxiliary Shelf is 48.3 cm (19 in.) wide, 35.5 cm (13.96 in.) high, and 35.5 cm (14 in.) deep, with the center mount wings on both sides of the shelves (see Figure 2).

The shelves consist of the following:

- QPC699 CE Backplane
- NT7D4401 CE Auxiliary Cantilever Power Adapter Cable (for NT7D44 only)
- NT7D4501 CE Auxiliary Center Power Adapter Cable (for NT7D45 only)

Each shelf requires a QPC355C or QPC691 Power Converter Card and an NT6D81 Power Regulator Board (PRB). Each shelf also uses the existing QPC173 Power Monitor Card and QAA47 Power Monitor Adapter (for the NT7D44 shelf) or QAA33 Power Monitor Adapter (for the NT7D45 shelf).

The following optional hardware can be installed on each shelf:

- NT8D68 Floppy Disk Unit (FDU), one per system
- NT8D69 Multi Disk Unit (MDU), one per system
- QPC472 DTI Card
- QPC720 PRI Card

**Note:** The FDU and MDU are mutually exclusive.

Card slot assignments for each shelf vary depending on the system configuration. Three options are available:

- MDU is equipped on the shelf (see Table 2).
- FDU is equipped on the shelf (see Table 3).
- MDU and FDU are not equipped (see Table 4).

**Table 2**  
**Card slot assignments—MDU equipped**

Circuit card	Card slot position	
	NT7D44	NT7D45
QPC173 Power Monitor Card	slot 16	slot 16
QPC355C or QPC691 Power Converter Card (Note 1)	slots 11 and 12	slots 1 and 2
QPC472 DTI Card and/or QPC720 PRI Card (Notes 2 and 3)	slots 2 and 3, or 7 and 8	slots 5 and 6, or 7 and 8
NT6D81 Power Regulator Board	slot 9 or 10	slot 3 or 4
NT8D69 Multi Disk Unit (Note 4)	slots 4, 5, and 6	slots 9, 10, and 11
<p><b>Note 1:</b> The power converter card occupies two card slots; however, only one slot provides power to the card (slot 11 on the NT7D44 and slot 2 on the NT7D45).</p> <p><b>Note 2:</b> The DTI or PRI card occupies two card slots.</p> <p><b>Note 3:</b> If the shelf is equipped with one MDU and two DTI or PRI cards, the PRB is no longer needed; therefore, another DTI or PRI card can be installed in slots 9 and 10 on the NT7D44, or slots 3 and 4 on the NT7D45.</p> <p><b>Note 4:</b> The MDU occupies three card slots.</p>		

**Table 3**  
**Card slot assignments—FDU equipped**

Circuit card	Card slot position	
	NT7D44	NT7D45
QPC173 Power Monitor Card	slot 16	slot 16
QPC355C or QPC691 Power Converter Card (Note 1)	slots 11 and 12	slots 1 and 2
QPC472 DTI Card and/or QPC720 PRI Card (Notes 2 and 3)	slots 3 and 4, 5 and 6, or 7 and 8	slots 5 and 6, 7 and 8, or 9 and 10
NT6D81 Power Regulator Board	slot 9 or 10	slot 3 or 4
NT8D68 Floppy Disk Unit (Note 4)	slots 1 and 2	slots 11 and 12
<p><b>Note 1:</b> The power converter card occupies two card slots; however, only one slot provides power to the card (slot 11 on the NT7D44 and slot 2 on the NT7D45).</p> <p><b>Note 2:</b> The DTI or PRI card occupies two card slots.</p> <p><b>Note 3:</b> If the shelf is equipped with three DTI or PRI cards, the PRB is no longer needed; therefore, another DTI or PRI card can be installed in slots 9 and 10 on the NT7D44, or slots 3 and 4 on the NT7D45.</p> <p><b>Note 4:</b> The FDU occupies two card slots.</p>		

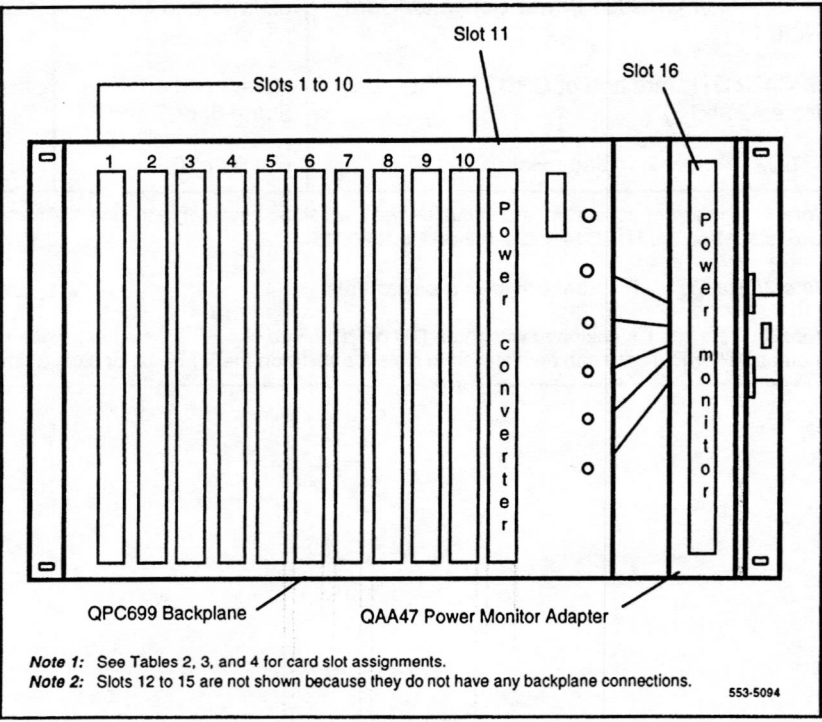
**Table 4**  
**Card slot assignments—MDU and FDU not equipped**

Circuit card	Card slot position	
	NT7D44	NT7D45
QPC173 Power Monitor Card	slot 16	slot 16
QPC355C or QPC691 Power Converter Card (Note 1)	slots 11 and 12	slots 1 and 2
QPC472 DTI Card and/or QPC720 PRI Card (Notes 2 and 3)	slots 3 and 4, 5 and 6, or 7 and 8	slots 5 and 6, 7 and 8, or 9 and 10
NT6D81 Power Regulator Board	slot 9 or 10	slot 3 or 4
<p><b>Note 1:</b> The power converter card occupies two card slots; however, only one slot provides power to the card (slot 11 on the NT7D44 and slot 2 on the NT7D45).</p> <p><b>Note 2:</b> The DTI or PRI card occupies two card slots.</p> <p><b>Note 3:</b> If the shelf is equipped with three DTI or PRI cards, the PRB is no longer needed; therefore, another DTI or PRI card can be installed in slots 9 and 10 on the NT7D44, or slots 3 and 4 on the NT7D45.</p>		

## QPC699 CE Backplane

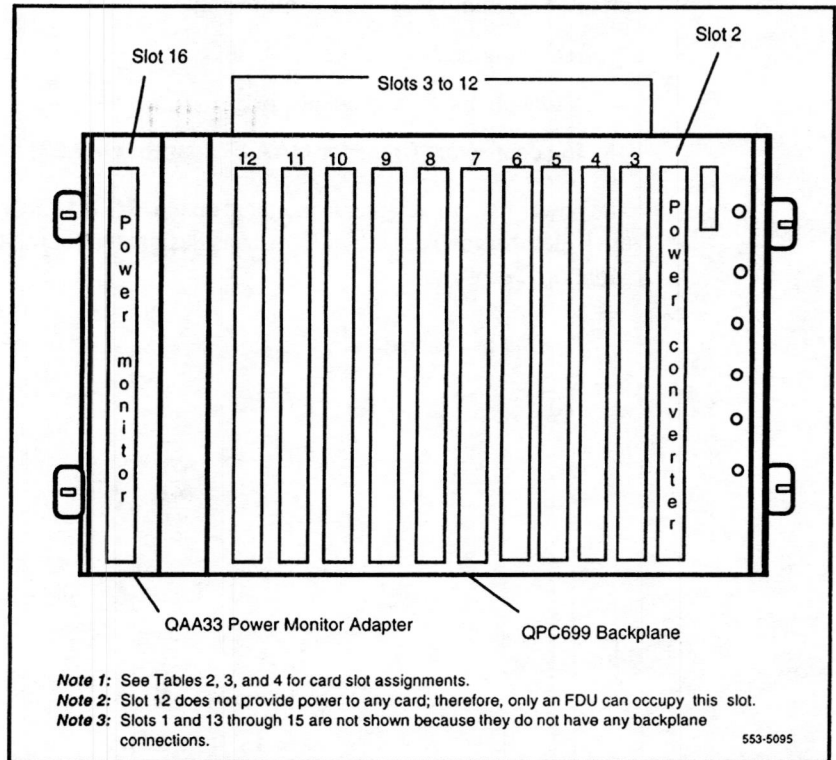
For the NT7D44 Power Monitor/CE Auxiliary Shelf, twelve 120-pin connectors are vertically mounted on the backplane for slots 1 to 10, slot 11 (power converter), and slot 16 (power monitor). See Figure 1.

**Figure 1**  
**Front view of backplane for NT7D44 Power Monitor/CE Auxiliary Shelf**



For the NT7D45 Power Monitor/CE Auxiliary Shelf, twelve 120-pin connectors are vertically mounted on the backplane for slot 2 (power converter), slots 3 to 12, and slot 16 (power monitor). See Figure 2.

**Figure 2**  
**Front view of backplane for NT7D45 Power Monitor/CE Auxiliary Shelf**



The power and ground paths are connected from the power distribution unit to the backplane through the Power Adapter Cable (NT7D4401 or NT7D4501). The following power and ground paths are provided on the backplane: -48 V, -48 V ground, +12 V, +5 V, and logic ground (LGND).

The QPC699 CE Backplane does not provide any electrical busing. All circuit cards have the input/output (I/O) connections accessible through faceplate connector cables.

## **QAA47 or QAA33 Power Monitor Adapter**

The QAA47 or QAA33 Power Monitor Adapter supports the power monitor. The QAA47 Power Monitor Adapter is installed on the NT7D44 shelf; the QAA33 Power Monitor Adapter is installed on the NT7D45 shelf. The power monitor assembly includes the following:

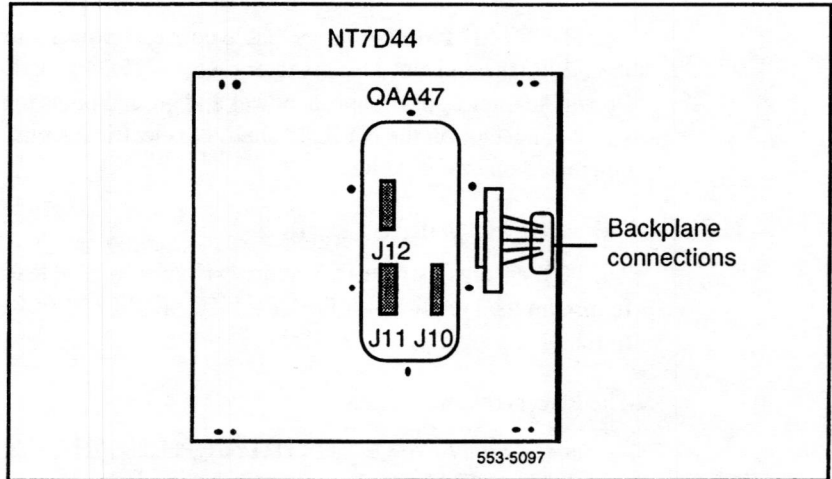
- mounting brackets
- a 120-pin backplane connector
- I/O connectors (three for QAA47; four for QAA33)

The power monitor adapter is mounted on the NT7D44 or NT7D45 shelf with the slider assigned as slot 16. Slot 16 is designated for the QPC173 Power Monitor Card only.

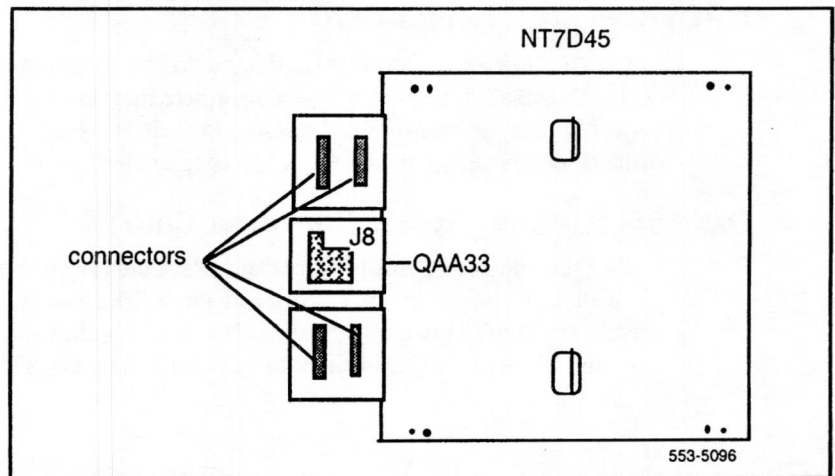


Figures 3 and 4 show the QAA47 and QAA33 Power Monitor Adapters mounted on the shelf side panel.

**Figure 3**  
**QAA47 Power Monitor Adapter on shelf—right side view**



**Figure 4**  
**QAA33 Power Monitor Adapter on shelf—left side view**





## **NT7D4401 or NT7D4501 Power Adapter Cable**

The NT7D4401 and NT7D4501 Power Adapter Cables provide power and ground paths to the QPC355C or QPC691 Power Converter Card on the NT7D44 and NT7D45 shelves, respectively.

The NT7D4401 Power Adapter Cable connects power and ground paths to the backplane and slot 11 connector on the NT7D44 shelf. The NT7D4501 Power Adapter Cable connects power and ground paths to the backplane and slot 2 connector on the NT7D45 shelf. No electrical signal paths are connected on the backplane.

## **NT6D81 Power Regulator Board**

The PRB ensures that the +5 V source is loaded with at least 8 A, which is the minimum load required for the QPC355C or QPC691 Power Converter Card to function properly.

The PRB is required when:

- none or only two QPC472 DTI or QPC720 PRI Cards are used in the shelf (see Tables 2, 3, and 4)
- only the MDU or FDU is used in the shelf

## **QPC173 Power Monitor Card**

The QPC173 Power Monitor Card has a dedicated slot on the shelf. On the NT7D44 shelf, it is located in slot 16, where the shroud is mounted on the QAA47 adapter chassis. On the NT7D45 shelf, it is located in slot 16, where the shroud is mounted on the QAA33 adapter chassis.

## **QPC355C/QPC691 Power Converter Card**

The QPC355C or QPC691 Power Converter Card is a double-width card with a dedicated slot on the shelf (slot 11 on the NT7D44 shelf and slot 2 on the NT7D45 shelf). However, because it is a double-width card, it occupies slots 11 and 12 on the NT7D44 shelf, or slots 1 and 2 on the NT7D45 shelf.

## **NT8D68 Floppy Disk Unit**

The FDU provides two floppy disk drives. The FDU does not have any connections to the backplane connectors. It occupies two adjacent card slots: slots 1 and 2 on the NT7D44 shelf, and slots 11 and 12 on the NT7D45 shelf.

## **NT8D69 Multi Disk Unit**

The MDU provides one hard disk drive and two floppy disk drives. The MDU does not have any electrical signal connections except power and ground paths from the backplane connectors. It occupies three adjacent card slots: slots 4, 5, and 6 on the NT7D44 shelf, and slots 9, 10, and 11 on the NT7D45 shelf.

Depending on the system configuration, either an NT8D68 FDU or an NT8D69 MDU may be used, but not both in one system.

## **QPC472 Digital Trunk Interface and QPC720 Primary Rate Interface Cards**

See Tables 2, 3, and 4 for the DTI or PRI card slot positions.

## **Functional description**

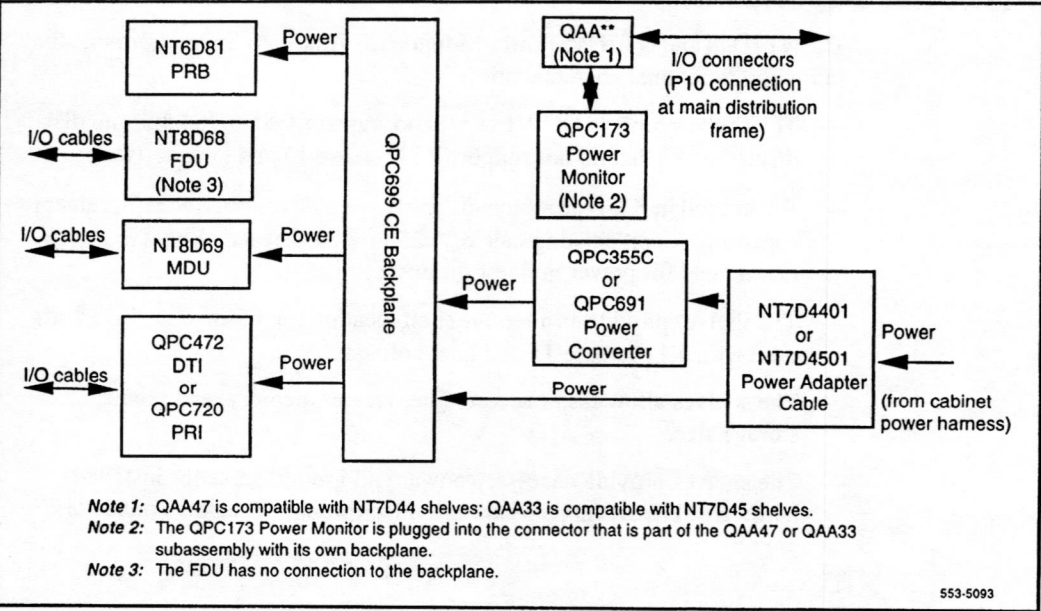
The NT7D44 and NT7D45 Power Monitor/CE Auxiliary Shelves provide the following functional characteristics:

- The shelves replace QUW1 or QSP45 Tape or QSD67/68 5.25-in. disk drive shelves that do not support X11 release 15 and later software.
- When used in XT-type system cabinets, the shelves provide replacement capability for an existing tape or 5.25-in. disk drive shelf that is maintained for power monitor purposes only.
- The shelves provide an alternate shelf location for 3.5-in. disk drive units used with X11 release 15 and later software.
- The shelves allow faster access time, greater memory, and greater storage size.
- The shelves provide necessary power and ground paths for installed hardware. The signal paths are provided through faceplate connectors.

- The shelves support the following circuit cards through 120-pin backplane connectors:
  - NT8D68 FDU
  - NT8D69 MDU
  - QPC173 Power Monitor Card
  - QPC355C or QPC691 Power Converter Card
  - QPC472 DTI Card
  - QPC720 PRI Card
- The shelves support the NT6D81 PRB for the minimum required power load.

Figure 5 shows a block diagram of the NT7D44 and NT7D45 Power Monitor/CE Auxiliary Shelves.

**Figure 5**  
**Power monitor/CE auxiliary shelves block diagram**



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## Installation procedure

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Perform the following procedure when replacing the QSD67 Disk Drive Shelf (cantilever mount) with the NT7D44 Power Monitor/CE Auxiliary Shelf, or when replacing the QSD68 Disk Drive Shelf (center mount) with the NT7D45 Power Monitor/CE Auxiliary Shelf.

This procedure refers to QSD67 and QSD68 shelves. However, references to the QSD67 and QSD68 shelves also apply to the QUW1 and QSP45 Tape Shelves that may be present in the existing system.

### Procedure 1 Installing shelves

- 1 Set the ENB/DIS switch on the QPC173 Power Monitor Card to DIS.  
**Note:** This action generates a system alarm that you can disregard at this time.
- 2 Set the CB11 switch on the QBL21 Power Distribution Unit to OFF.
- 3 For the QSD67 Disk Drive Shelf, disconnect the I/O cables to the QAA47 Power Monitor Adapter located on the side of the shelf (refer to Figure 3).  
For the QSD68 Disk Drive Shelf, disconnect the I/O cables to the QAA33 Power Monitor Adapter located on the side of the shelf (refer to Figure 4).
- 4 Unplug the power connector and remove the shelf mounting screws.
- 5 Remove the QSD67/68 Disk Drive Shelf from the cabinet.
- 6 Unpack and inspect the power monitor/CE auxiliary shelf.
- 7 Disassemble the QAA47 (on QSD67) or QAA33 (on QSD68) Power Monitor Adapter from the QSD67/68 Disk Drive Shelf.

- 8      Reassemble the QAA47 or QAA33 Power Monitor Adapter on the NT7D44 or NT7D45 power monitor/CE auxiliary shelf, respectively.
- 9      Install the power monitor/CE auxiliary shelf in the same location as the QSD67/68 Disk Drive Shelf.
- 10     Reconnect the power connector to the power monitor/CE auxiliary shelf.
- 11     Reconnect the I/O cables to the QAA47 or QAA33 Power Monitor Adapter in the power monitor/CE auxiliary shelf (refer to Figures 3 and 4).
- 12     Remove the QPC173 Power Monitor Card from the QSD67/68 Disk Drive Shelf and install it in slot 16 of the power monitor/CE auxiliary shelf.
- 13     Install the NT6D81 Power Regulator Board in slots 9 and 10 of the NT7D44 shelf, or slots 3 and 4 of the NT7D45 shelf.
- 14     Install the QPC355C or QPC691 Power Converter Card in slots 11 and 12 of the NT7D44 shelf, or slots 1 and 2 of the NT7D45 shelf.
- 15     Install the NT8D68 FDU or NT8D69 MDU in the appropriate slots on the power monitor/CE auxiliary shelf (refer to Tables 2 and 3).
- 16     If needed, install QPC472 DTI and/or QPC720 PRI cards in the appropriate slots on the power monitor/CE auxiliary shelf (refer to Tables 2, 3, and 4).
- 17     Connect and enable the NT8D68 FDU or NT8D69 MDU. Refer to *Disk drive upgrade procedures* (553-3001-251).  
  
**Note:** The FDU interfaces with the QPC742 (vintage D or later) Floppy Disk Interface (FDI) card; the MDU interfaces with the QPC584 (vintage F4, or K, or later) Mass Storage Interface (MSI) card. See *Circuit card installation and testing* (553-3001-211) for the correct switch settings for the QPC742 and QPC584 cards.
- 18     Set the CB11 switch on the QBL21 Power Distribution Unit to ON.
- 19     Set the ENB/DIS switch on the QPC173 Power Monitor Card to ENB.  
  
**Note:** This action should clear the system alarm generated in step 1. If the alarm does not clear, check the power connections to the new shelf and the power monitor adapter.
- 20     Connect and enable the QPC472 DTI and/or QPC720 PRI Cards. See *Digital Trunk Interface/Computer-to-PBX Interface installation and data administration* (553-2811-200) and *ISDN Primary Rate Interface installation* (553-2901-200).

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Meridian 1

## **Power monitor/common equipment auxiliary shelves**

Description and installation

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CIRCUIT PACK  
INSTALLATION AND TESTING  
553-3001-211



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Meridian 1

# Circuit card installation and testing

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## About this document

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This document provides the following:

- a list of compatible slots for circuit cards used in options 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C
- a general procedure for initially installing a circuit card
- acceptance tests for circuit cards that provide service functions, network control, and line and trunk connections
- option settings for the PBX circuit cards currently supported by Northern Telecom

**Note:** For information on equipment used with system option 11, see the appropriate documentation for that product.

- sample option settings for system configurations with NT8D22 System Monitors

For detailed procedures for removing a specific circuit card and installing a replacement, see *Meridian 1 hardware replacement* (553-3001-520).

For option settings on telephones, attendant consoles, or add-on modules, see the appropriate document for that equipment.

For a description of all administration programs and maintenance programs, see the *X11 input/output guide*. For information about system messages, see the *X11 system messages guide*.



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## Circuit card installation

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### Card slots—System options 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C

The following table in this chapter identifies card slot compatibility in the following modules:

- NT5D21 Core/Network Module  
required for options 51C, 61C, and 81C
- NT5K11 Enhanced Existing Peripheral Equipment (EEPE) Module
- NT6D39 CPU/Network Module  
required for options 51 and 61
- NT6D60 Core Module  
required for option 81
- NT8D11 Common/Peripheral Equipment (CE/PE) Module  
required for options 21A, 21, and 21E
- NT8D13 Peripheral Equipment (PE) Module  
optional for options 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C
- NT8D34 CPU Module  
required for option 71
- NT8D35 Network Module  
required for options 71, 81, and 81C, optional for options 21, 21E, 51, 51C, 61, and 61C
- NT8D36 InterGroup Module  
required for options 71, 81, and 81C
- NT8D37 Intelligent Peripheral Equipment (IPE) Module  
required for options 51, 51C, 61, 61C, 71, 81, and 81C, optional for options 21 and 21E

- NT8D47 Remote Peripheral Equipment (RPE) Module  
optional for options 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C
- NT9D11 Core/Network Module required for options 51C and 61C

**Table 1****System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 1 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT1P61 Fibre Superloop Network card	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CPU/Net: 1–8	Core/Net: 0–7	Net: 5–12	Net: 5–12
NT1P62 Fibre Peripheral Controller card	—	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"
NT1R52 Remote Carrier Interface	—	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"
NT1R20 Off-Premise Station Line Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: all but "Contr"	CE/PE: 0–9 (PE) IPE: all but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT4D18 Hybrid Bus Terminator	—	—	—	—	Core/Net: between 11 and 12	—	—
NT4D19 and NT4D23 Hybrid Bus Terminators	—	—	—	—	Core/Net: between 0 and 1	—	—
NT4D20 and NT4D22 Hybrid Bus Terminators	—	—	—	—	Core/Net: between 1 and 2	—	—
NT5D03 Call Processor Card	—	—	—	—	Core/Net: 15 & 16; except 14 & 15 for NT9D11 see <b>Note 2</b> and <b>Note 8</b> .	—	Core: 14 & 15; see <b>Note 2</b> and <b>Note 8</b> .

**Note:** All notes are displayed at the end of the table; see page 18.



Table 1

System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 2 of 15)

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT5D10 Call Processor Card	—	—	—	—	Core/Net: 15 & 16; except 14 & 15 for NT9D11: see <b>Note 2</b> and <b>Note 8</b> .	—	Core: 14 & 15; see <b>Note 2</b> and <b>Note 8</b> .
NT5D11 and NT5D14 Line side T1 Line Card	—	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5D12AA Dual DTI/PRI Card	—	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CPU/Net: 1–8	Core/Net: 0–7	Net: 5–12	Net: 5–12
NT5D61 IODU/C	—	—	—	—	Core/Net: 16, 17 & 18 for NT9D11; and 17, 18 & 19 for NT5D21: see <b>Note 2</b> and <b>Note 8</b> .	—	—
NT5D20 IOP/CMDU	—	—	—	—	Core/Net: 17. Except: see <b>Note 1</b>	—	Core: 16
NT5D51 MICB	—	—	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5G11 MICA	—	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K02 Analog Line Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"

**Note:** All notes are displayed at the end of the table; see page 18.



Table 1

System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 3 of 15)

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT5K07 Universal Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K09 Quad Density Digitone Receiver	—	EEPE Slot 2 of section A or B at rear of module	EEPE Slot 2 of section A or B at rear of module	EEPE Slot 2 of section A or B at rear of module	EEPE Slot 2 of section A or B at rear of module	EEPE Slot 2 of section A or B at rear of module	EEPE Slot 2 of section A or B at rear of module
NT5K10 Dual Loop Buffer	—	NT5K10 Dual Loop Buffer	NT5K10 Dual Loop Buffer	NT5K10 Dual Loop Buffer	NT5K10 Dual Loop Buffer	NT5K10 Dual Loop Buffer	NT5K10 Dual Loop Buffer
NT5K12 Enhanced Peripheral Equipment Power Supply	—	NT5K12 EPE Power Supply	NT5K12 EPE Power Supply	NT5K12 EPE Power Supply	NT5K12 EPE Power Supply	NT5K12 EPE Power Supply	NT5K12 EPE Power Supply
NT5K17 Direct Dial Inward Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K18 Central Office Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K19 E&M Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K36 Direct Inward/Direct Outward Dial Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"

**Note:** All notes are displayed at the end of the table; see page 18.

Table 1

System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 4 of 15)

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT5K35 NT6D11AC D-Channel Handler Interface	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
NT5K70 Central Office Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K71 Central Office Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K72 E&M Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K82 Central Office Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K83 E&M Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K84 Direct Inward Dial Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K90 Central Office Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"

**Note:** All notes are displayed at the end of the table; see page 18.

**Table 1**  
**System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 5 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT5K93 Central Office Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K96 Analog Line Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K99 Central Office Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT5K20 Extended Tone Detector	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT6D6003 Core Bus Terminator	—	—	—	—	Core/Net: 13 (only for NT9D11)	—	Core: 13
NT6D63 I/O Processor Card	—	—	—	—	Core/Net: 16 & 17 (only for NT9D11) see <b>Note 2</b>	—	Core: 16 & 17; see <b>Note 2</b>
NT6D64 Core Multi Drive Unit	—	—	—	—	Core/Net: 18 (only for NT9D11) see <b>Note 2</b>	—	Core: 18
NT6D65 Core to Network Interface	—	—	—	—	51C/61C Core/Net: 12 81C Core/Net: 12-14	—	Core: 8-10
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

**Table 1****System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 6 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT6D66 Call Processor Card	—	—	—	—	Core/Net: 15 & 16; except 14 & 15 for NT9D11 see <b>Note 2</b> and <b>Note 8</b> .	—	Core: 14 & 15; see <b>Note 2</b> and <b>Note 8</b> .
NT6D70 S/T Interface Line Card	—	—	CE/PE: 0–9 (PE) IPE: all but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT6D71 U Interface Line Card	—	—	CE/PE: 0–9 (PE) IPE: all but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT6D72 Basic Rate Signal Concentrator Card	—	—	CE/PE: 0–9 (PE) IPE: all but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT6D73 Multi-purpose ISDN Signaling Processor Card	—	—	CE/PE: 4–9 (Net)	CPU/Net: 1–8	Core/Net: 0–7	Net: 5–12	Net: 5–12
NT6D80 MSDL	—	—	CE/PE: 4–9 (Net)	CPU/Net: 1–8, 13	Core/Net: 0–7	Net: 5–12	Net: 5–12
NT7D16 Data Access Card	CE/PE: 0–9 (PE); see <b>Note 3</b>	CE/PE: 0–9 (PE); see <b>Note 3</b>	CE/PE: 0–9 (PE); see <b>Note 3</b>	IPE: any slot but "Contr"; see <b>Note 4</b>	IPE: any slot but "Contr"	IPE: any slot but "Contr" see <b>Note 4</b>	IPE: any slot but "Contr" see <b>Note 4</b>
NT7R51 Local Carrier Interface	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CPU/Net: 1–8	Core/Net: 0–7	Net: 5–12	Net: 5–12
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

Table 1

System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 7 of 15)

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT8D01 Controller Card	—	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"	IPE: "Contr"
NT8D02 Digital Line Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT8D03 Analog Line Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT8D04 Superloop Network Card	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CPU/Net: 1–8	Core/Net: 0–7	Net: 5–12	Net: 5–12
NT8D09 Analog Message Waiting Line Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT8D14 Universal Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT8D15 E&M Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	CE/PE: 0–9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT8D16 Digitone Receiver Card	—	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NT8D17 Conference/TDS Card	CE/PE: 4 (Net)	CE/PE: 4 (Net)	CE/PE: 4 (Net)	CPU/Net: 1–8	Core/Net: 0–7	Net: 5–12	Net: 5–12
NT8D18 Network/DTR Card	CE/PE: 10 (Net)	CE/PE: 10 (Net)	CE/PE: 10 (Net)	—	—	—	—
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							



**Table 1**  
**System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 8 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NT8D19 Memory/ Peripheral Signaling Card	CE/PE: 3 (CPU/ Mem)	CE/PE: 3 (CPU/ Mem)	—	—	—	—	—
NT8D41 Dual Port SDI Paddle Board	CE/PE: any rear bkplane slot	CE/PE: any rear bkplane slot	CE/PE: any rear bkplane slot	CPU/Net: rear bkplane 7, 8, 12	Core/Net: 7 and 8	—	—
NT8D68 Floppy Disk Unit	CE/PE: any 2 slots	CE/PE: any 2 slots	—	CPU/Net: 18; see <b>Note 2</b>	—	—	—
NT8D69 Multi Disk Unit	—	—	—	CPU/Net: 18; see <b>Note 5</b>	—	CPU: 15–17; see <b>Note 5</b>	—
NT8D72 Primary Rate Interface Card	CE/PE: 4-8 (Net)	CE/PE: 4-8 (Net) Net: 5-11, 13-14 RPE: 1, 11-12	CE/PE: 4-8 (Net) Net: 5-11, 13-14 RPE: 1, 11-12	CPU/ Net: 3-7 Net: 5-11, 13-14 RPE: 1, 11-12	Core/Net: 0-7 Net: 5-11, 13-14 RPE: 1, 11-12	CPU: 8-12, 15-16 Net: 5-11, 13-14 RPE: 1, 11-12	Core: 0-3 Net: 5-11, 13-14 RPE: 1, 11-12
NT9D19 Call Processor card	—	—	—	—	Core/Net: 15 & 16; see <b>Note 2</b>	—	Core: 14 & 15; see <b>Note 2</b>
NT9D33 Small System Multi Disk Unit	—	—	CE/PE: any 2 slots	—	—	—	—
NT9D34 Enhanced Mass Storage Interface Card	—	—	CE/PE: 1 (CPU/ Mem)	CPU/Net: 12	—	CPU: 7	—
NTAG03 Central Office Trunk Card	CE/PE: 0–9 (PE)	CE/PE: 0–9 (PE) IPE: any slot but “Contr”	CE/PE: 0–9 (PE) IPE: any slot but “Contr”	IPE: any slot but “Contr”	IPE: any slot but “Contr”	IPE: any slot but “Contr”	IPE: any slot but “Contr”

**Note:** All notes are displayed at the end of the table; see page 18.

**Table 1****System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 9 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NTAG04 Central Office/Direct Inward Dial Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NTAG36 MIRAN	—	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NTBK51AA D-Channel Daughterboard	—	On any Dual DTI/ PRI card	On any Dual DTI/ PRI card	On any Dual DTI/ PRI card	On any Dual DTI/ PRI card	On any Dual DTI/ PRI card	On any Dual DTI/ PRI card
NTCK16 Generic Central Office Trunk Card	CE/PE: 0-9 (PE)	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	CE/PE: 0-9 (PE) IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"	IPE: any slot but "Contr"
NTND01 Integrated CPU/ Memory Card	—	—	CE/PE: 2 (CPU/ Mem)	—	—	—	—
NTND02 Misc/SDI/ Peripheral Signaling Card	—	—	CE/PE: 3 (CPU/ Mem)	—	—	—	—
NTND09Bx 6 Mbyte Memory Card	—	—	—	CPU/Net: 17	—	CPU: 1-2; see <b>Note 6</b>	—
NTND09 Cx 12 Mbyte Memory Card	—	—	—	CPU/Net: 17	—	CPU: 2	—
NTND10 Changeover Memory Arbitrator Card	—	—	—	CPU/Net: 16	—	CPU: 3	—
NTND15 Floppy Disk Unit	—	—	CE/PE: any 2 slots	—	—	—	—
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

**Table 1**  
**System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 10 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
NTND16 Multi Disk Unit	—	—	—	CPU/Net: 18; see <b>Note 5</b>	—	CPU: 15–17; see <b>Note 5</b>	—
QPC43 Peripheral Signaling Card	—	—	—	CPU/Net: 10	Core/Net: 10	Net: 4	Net: 4
QPC62 1.5 Mbyte Converter Card	—	RPE: 2 and 9	RPE: 2 and 9	RPE: 2 and 9	RPE: 2 and 9	RPE: 2 and 9	RPE: 2 and 9
QPC63 Local Carrier Buffer Card	—	RPE: 5–6	RPE: 5–6	RPE: 5–6	RPE: 5–6	RPE: 5–6	RPE: 5–6
QPC65 Remote Peripheral Switch Card	—	RPE: 5–6	RPE: 5–6	RPE: 5–6	RPE: 5–6	RPE: 5–6	RPE: 5–6
QPC66 2 Mbyte Converter Card	—	RPE: 3 and 8	RPE: 3 and 8	RPE: 3 and 8	RPE: 3 and 8	RPE: 3 and 8	RPE: 3 and 8
QPC67 Carrier Maintenance Card	—	RPE: 10	RPE: 10	RPE: 10	RPE: 10	RPE: 10	RPE: 10
QPC71 E&M/DX Trunk Card	—	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”
QPC99 Carrier Interface Card	—	RPE: 4 and 7	RPE: 4 and 7	RPE: 4 and 7	RPE: 4 and 7	RPE: 4 and 7	RPE: 4 and 7
QPC192 Off-Premises Extension Card	—	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”
QPC215 Segmented Bus Extender Card	—	—	—	—	—	CPU: 8–12	—
QPC237 4-Wire E&M/DX Trunk Card	—	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”
QPC250 Release Link Trunk Card	—	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”

**Note:** All notes are displayed at the end of the table; see page 18.



Table 1

System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 11 of 15)

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
QPC297 Attendant Console Monitor Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC412 InterGroup Switch Card	—	—	—	—	81C only: Core/Net: 8, 9	Net: 2, 3	Net: 2, 3
QPC414 Network Card	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CPU/Net: 1–8	Core/Net: 0–7	Net: 5–12	Net: 5–12
QPC422 Tone Detector Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC430 Asynchronous Interface Line Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC432 4-Port Data Line Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC441 3-Port Extender Card	—	—	—	CPU/Net: 11	Core/Net: 11	Net: 1	Core: 7 Net: 1
QPC449 Loop Signaling Trunk Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC450 CO/FX/WATS Trunk Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC471 Clock Controller Card	CE/PE: 4–7 (Net)	CE/PE: 4–7 (Net)	CE/PE: 4–7 (Net)	CPU/Net: 9	51C/61C Core/Net: 9 For 81C: see <b>Note 7</b>	CPU: 14	Core: 6
QPC477 Bus Terminating Units: QPC477A9	—	—	—	CPU/Net: 2/3	Core/Net: 0/1 only in NT9D11	Net: 11/12	Core: 4/5 Net: 11/12
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

**Table 1**  
**System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 12 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
QPC477B10 (replaces A10)	—	—	—	CPU/Net: 1/2	Core/Net: 1/2 only in NT9D11	Net: 12/13	Core: 5/6 Net: 12/13
QPC477A20 Bus Terminating Unit	—	—	—	—	—	CPU: 13/14	—
QPC477A21 Bus Terminating Unit	—	—	—	—	—	CPU: 13/14	—
QPC477A22 Bus Terminating Unit	—	—	—	CPU/Net: 12/13	—	—	—
QPC513 Enhanced Serial Data Interface Card	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CE/PE: 4–9 (Net)	CPU/Net: 1–9, 13	Core/Net: 9, 13	CPU: 6, 13 Net: 5–13	Core: 6, 13 Net: 5–13
QPC578 Integrated Services Digital Line Card	—	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”
QPC579 CPU Function Card	—	—	—	CPU/Net: 14	—	CPU: 5	—
QPC580 CPU Interface Card	—	—	—	CPU/Net:1 5	—	CPU: 4	—
QPC581 Changeover Memory Arbitrator Card	—	—	—	CPU/Net: 16	—	CPU: 3	—
QPC583 Memory Card	—	—	—	CPU/Net: 17	—	CPU: 1–2	—
QPC584 Mass Storage Interface Card	—	—	—	CPU/Net: 12	—	CPU: 7	—
QPC594 16-Port 500/2500 Line Card	—	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”	PE: any slot but “DLB”
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

**Table 1****System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 13 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
QPC659 Dual Loop Peripheral Buffer Card	—	PE: "DLB"	PE: "DLB"	PE: "DLB"	PE: "DLB"	PE: "DLB"	PE: "DLB"
QPC687 CPU Card	CE/PE: 2 (CPU/Mem)	CE/PE: 2 (CPU/Mem)	—	—	—	—	—
QPC720 Primary Rate Interface Card	CE/PE: 4–8 (Net)	CE/PE: 4–8 (Net) Net: 5–11, 13–14 RPE: 1, 11–12	CE/PE: 4–8 (Net) Net: 5–11, 13–14 RPE: 1, 11–12	CPU/Net: 3–7 Net: 5–11, 13–14 RPE: 1, 11–12	Core/Net: 0–7 Net: 5–11, 13–14 RPE: 1, 11–12	CPU: 8–12, 15–16 Net: 5–11, 13–14 RPE: 1, 11–12	Core: 0–3 Net: 5–11, 13–14 RPE: 1, 11–12
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

**Table 1**  
**System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 14 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
QPC723 RS-232 4-Port Interface Line Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC742 Floppy Disk Interface Card	CE/PE: 1 (CPU/ Mem)	CE/PE: 1 (CPU/ Mem)	CE/PE: 1 (CPU/ Mem)	CPU/Net: 12	—	—	—
QPC757 D-Channel Handler Interface Card	—	CE/PE: 4-9 (Net)	CE/PE: 4-9 (Net)	CPU/Net: 1-9, 13	PE: any slot but "DLB"	Net: 5-13	Net: 5-13
QPC775 Clock Controller	CE/PE: 4-7 in Net area	CE/PE: 4-7 in Net area	CE/PE: 4-7 in Net area	CPU/Net: 9	51C/61C Core/Net: slot 14. For 81C: see <b>Note 7</b>	CPU: 14	Core: 14
QPC789 16-Port 500/2500 (Message Waiting) Line Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
QPC841 4-Port Serial Data Interface Card	CE/PE: 4-9 (Net)	CE/PE: 4-9 (Net)	CE/PE: 4-9 (Net)	CPU/Net: 1-9, 13	Core/Net: 0-7	Core: None Net: 5-13	Core/Net: 0-7 Net: 5-13
QPC918 High-Speed Data Card	—	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"	PE: any slot but "DLB"
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

**Table 1****System option 21A, 21, 21E, 51, 51C, 61, 61C, 71, 81, and 81C card slots (Part 15 of 15)**

Component	21A	21	21E	51/61	51C/ 61C/81C	71	81
<b>Note 1:</b> In option 61C with NT9D11, use slot 16.							
<b>Note 2:</b> The card occupies two slots.							
<b>Note 3:</b> This applies to NT8D11BC or NT8D11EC, CE/PE Modules. In NT8D11AC or NT8D11DC modules, use only slot 0.							
<b>Note 4:</b> This applies to NT8D37BA or NT8D37EC IPE Modules. In NT8D37AA or NT8D37DC modules, use only slots 0, 4, 8, and 12.							
<b>Note 5:</b> This card requires three slots.							
<b>Note 6:</b> If only one NTND09 card is used, install it in slot 2 (next to the CMA card).							
<b>Note 7:</b> In option 81C, use NT8D35 Net slot 13; in QSD39 shelf, use Net slot 2; in QSD40 shelf, use slot 13.							
<b>Note 8:</b> In option 81 or 81C, do not use this card for X11 Release 22.							
<b>Note:</b> All notes are displayed at the end of the table; see page 18.							

## Precautions

To avoid personal injury and equipment damage, review the following guidelines before handling Meridian 1 equipment.

### **WARNING**

Module covers are not hinged; do not let go of the covers. Lift covers away from the module and set them out of your work area.

### **WARNING**

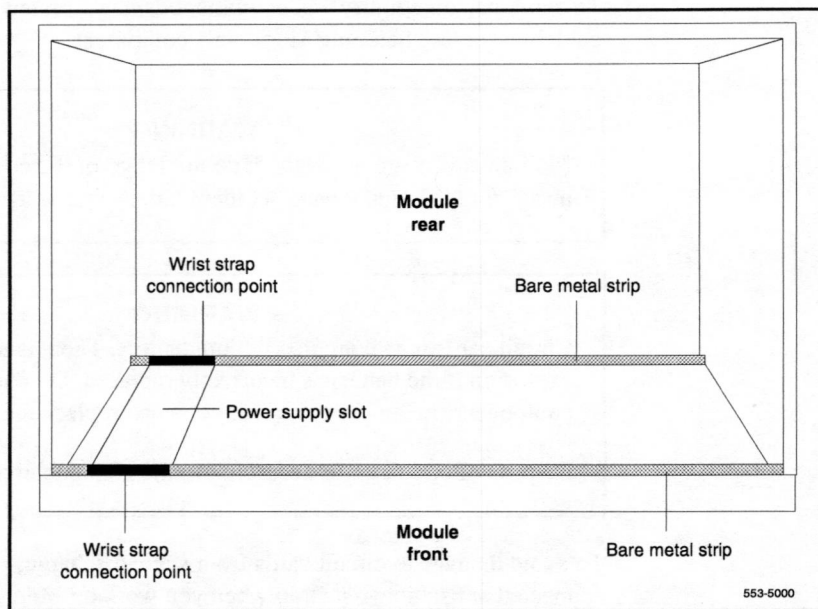
Circuit cards may contain a lithium battery. There is a danger of explosion if the battery is incorrectly replaced. Do not replace components on any circuit card; you must replace the entire card.

Dispose of circuit cards according to the manufacturer's instructions.

To avoid damage to circuit cards from static discharge, wear a properly connected antistatic wrist strap when you work on Meridian 1 equipment. If a wrist strap is not available, regularly touch one of the bare metal strips in a module to discharge static. Figure 1 shows the recommended connection points for the wrist strap and the bare metal strips you should touch.



**Figure 1**  
**Static discharge points**



Handle circuit cards as follows:

- Unpack or handle cards away from electric motors, transformers, or similar machinery.
- Handle cards by the edges only. Do not touch the contacts or components.
- Set cards on a protective antistatic bag. If an antistatic bag is not available, hand-hold the card, or set it in a card cage unseated from the connectors.
- Store cards in protective packing. Do not stack cards on top of each other unless they are packaged.
- Keep cards installed in the system as much as possible to avoid dirty contacts and unnecessary wear.
- Store cards in a cool, dry, dust-free area.

During repair and maintenance procedures do the following:

- Turn off the circuit breaker or switch for a module power supply before the power supply is removed or inserted.

**Note:** In AC-powered systems, capacitors in the power supply must discharge. Wait five full minutes between turning off the circuit breaker and removing the power supply from the module.

- Software disable cards, if applicable, before they are removed or inserted.
- Hardware disable cards, whenever there is an enable/disable switch, before they are removed or inserted.
- Return defective or heavily contaminated cards to a repair center. Do not try to repair or clean them.



## Installing a circuit card

This procedure provides detailed installation instructions for Meridian 1 circuit cards.

### **WARNING**

To avoid personal injury and equipment damage, read all of the guidelines in "Precautions" on page 19 before you begin installation and follow all guidelines throughout the procedure.

### **Procedure 1** **Installation**

- 1      Open the protective carton and remove the circuit card from the antistatic bag. Return the antistatic bag to the carton and store it for future use.
- 2      Inspect the card components, faceplate, locking devices, and connectors for damage. If damaged, tag the card with a description of the problem and package it for return to a repair center.
- 3      Refer to the work order to determine the module and slot location for the card.
- 4      If there is an enable/disable (Enb/Dis) switch on the faceplate, set it to Dis.
- 5      If there are option switches or jumpers on the card, set them according to the work order (see "Option settings" on page 37).

### **CAUTION**

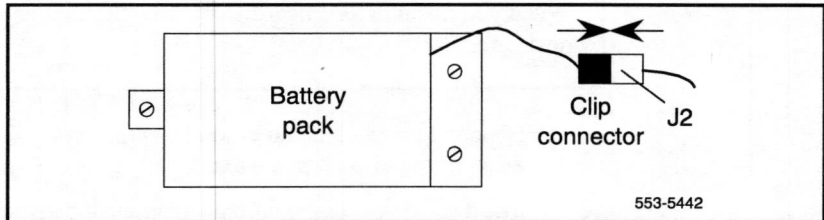
Incorrectly set switches on common equipment circuit cards may cause a system failure.

- 6** If you are installing an NTND02 Misc/SDI/Peripheral Signaling (MSPS) Card, the A0378252 Battery Pack Assembly must be attached:

- Position the battery pack on the component side of the MSPS card. From the back of the card, install the screws that secure the battery pack.
- On the component side of the MSPS card, plug in the clip connector wired to the battery pack. Make sure the connector key is centered on J2 (see Figure 2).

**Note:** The battery will not be fully charged until 24 hours after installation in a powered system.

**Figure 2**  
**Connector for the battery pack assembly**



- 7** If you are installing one of the following cards, the QMM42 Security Data Cartridge must be attached:

- NT6D63 I/O Processor (IOP) Card
- QPC584 Mass Storage Interface (MSI) Card
- NT9D34 Enhanced Mass Storage Interface (EMSI) Card
- QPC742 Floppy Disk Interface (FDI) Card

To install a data cartridge, plug it into the connectors on the component side of the host card and install the screw that secures the data cartridge.

**CAUTION**

To avoid system failure, the ID number on the data cartridge must match the ID number on the system software diskettes.

- 8     If you are installing one of the following cards, the associated ROM card must be attached:
- NTND01 Integrated CPU/Memory (ICM) Card—NTND31 ROM
  - QPC579 CPU Function (FN) Card—NTND08 or QPC939 ROM
  - QPC687 CPU Card—QPC940 ROM

To install a ROM card, plug it into the connectors on the component side of the host card.

**Note:** For the NTND31 ROM Card, you must also install a screw and washer at each corner of the ROM card.

**CAUTION**

When you install a ROM card, do not touch other components on the host card.

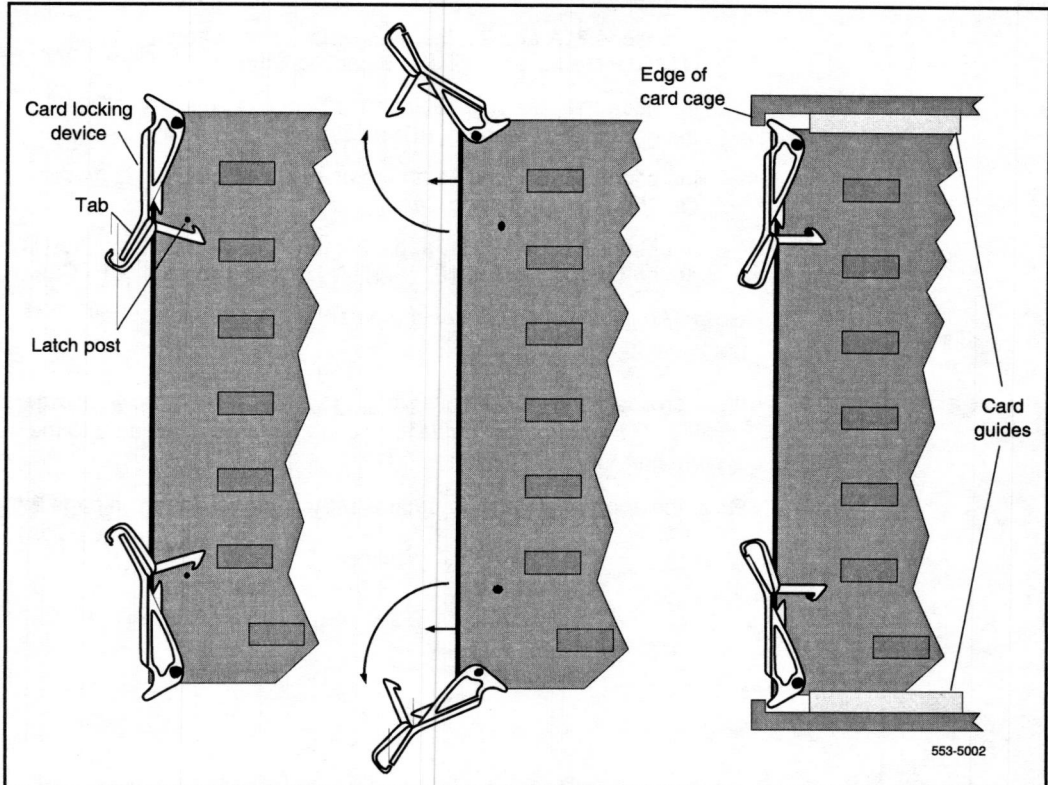
- 9     Squeeze the ends of the locking devices on the card and pull the tabs away from the latch posts and faceplate (see Figure 3).
- 10    Insert the card into the card aligning guides in the card cage. Gently push the card into the slot until you feel resistance. The tip of the locking device must be behind the edge of the card cage (see Figure 3).
- 11    Lock the card into position by simultaneously pushing the ends of the locking devices against the faceplate.

**Note:** When IPE cards are installed, the red LED on the faceplate remains lit for two to five seconds as a self-test runs. If the self-test completes successfully, the LED flashes three times and remains lit until the card is configured and enabled in software, then the LED goes out. If the LED does not follow the pattern described or operates in any other manner (such as continually flashing or remaining weakly lit), replace the card.

- 12    If there is an enable/disable switch, set it to Enb.

**Note:** Do not enable the switch on an NT8D04 Superloop Network Card or QPC414 Network Card until network loop cables are installed.

**Figure 3**  
**Installing the circuit card in the card cage**



- 13**     If you are adding a voice, conference, or tone and digit loop, press the manual initialize (Man Int) button if the card is associated with the active CPU:
- In options 21A and 21, the manual initialize button is on the NT8D19 Memory/Peripheral Signaling Card.
  - In option 21E, the manual initialize button is on the NTND01 Integrated CPU/Memory (ICM) Card.
  - In options 51, 61, and 71, the manual initialize button is on the QPC580 CPU Interface Card.
  - In options 51C, 61C, 81, and 81C, the manual initialize button is on the NT6D66, NT5D10, or NT5D03 Call Processor (CP) Card.
- Note:** An initialization causes a momentary interruption in call processing.
- 14**     If you are installing the card in a working system, refer to the work order and the *X11 input/output guide* to add the required office data to the system memory.
- 15**     Go to the appropriate test procedure in "Acceptance tests" on page 27.

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## Acceptance tests

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Test procedures for most circuit cards require that internal and external cabling be installed. See the appropriate installation document for your system and *Telephone and attendant console installation* (553-3001-215) for cabling procedures.

### Procedure 2 Conference cards

Use this procedure to test a conference card or to test the conference function of an NT8D17 Conference/TDS Card.

- 1 Log into the system:  
**LOGI** (password)
- 2 Request the status of a loop on the conference card:  
**LD 38**  
**STAT loop**

Conference status is formatted as follows:

CNFC n DSBL n BUSY

"n" represents the number of conference groups disabled and busy

CHAN n DSBL n BUSY

"n" represents the number of channels disabled and busy

UNEQ

card is not equipped in the system

DSBL

card is disabled in software



- 3      If the conference card loop is disabled, enable it.  
For an NT8D17 Conference/TDS Card, enter:  
**ENLX loop**  
(the conference loop is the odd loop of the conference/TDS loop pair)  
  
**Note:** The conference/TDS card is not enabled automatically when it is inserted. You must enable the card with the command ENLX. (This command is used in LD 34 and LD 46 to address even loops and in LD 38 to address odd loops.) Enabling the loops with the command ENLL does not enable the hardware for the card.  
  
For other than an NT8D17 Conference/TDS Card, enter:  
**ENLL loop**  
(the conference loop must be an even loop for cards other than the NT8D17)  
  
If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.
- 4      Test the conference loop for channel, group, and switching faults:  
**CNFC loop**  
  
If the conference loop passes the tests, the output is **OK**.  
  
If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.
- 5      Prepare the system for a manual conference call on a specified loop:  
**CNFC MAN loop c" c"** is the manual conference group (1-15)  
  
A manual conference test is performed by stepping through conference channels and groups, listening for noise that indicates a faulty card.  
  
The manual conference test can be performed through a system terminal or BCS maintenance telephone. If commands are entered from a maintenance telephone, this telephone automatically becomes part of the manual conference call.  
  
Only one manual conference call is allowed at one time. A manual conference consists of only two telephones, where one telephone acts as a signal source while the other acts as a listening monitor.

After you enter the CNFC command, any two telephones (one may already be the maintenance telephone) dialing the special service prefix code (SPRE) and the digits 93 will enter the manual conference call. The prime directory number (PDN) indicator, if equipped, will light on each telephone.

Going on-hook takes the telephone out of the manual conference call, and the test must be restarted.

See "LD38" in the *X11 input/output guide* for more detailed information on using this command.

- 6** Test various channels and conference groups audibly with the command

**CNFC STEP**

When stepping through channels and groups, a clicking followed by silence is normal. Any distortion or other noises indicates a faulty card.

Once the CNFC STEP command has been entered, entering **C** on the system terminal or maintenance telephone steps through the conference channels. Entering **G** steps through the conference groups. There are 15 channels per group and 15 groups per conference card.

Entering an asterisk (\*) and END stops the test.

Again, see "LD 38" in the *X11 input/output guide* for detailed information on using this command.

- 7** End the session in LD 38:  
\*\*\*\*



**Procedure 3**  
**Digitone receiver cards**

Use this procedure to test a Digitone receiver (DTR) card, a DTR daughterboard, or the DTR function on the NT8D18 Network/DTR Card.

**Note:** The DTR daughterboard connected to a QPC659 Dual Loop Peripheral Buffer Card cannot be assigned when the peripheral equipment (PE) shelf is used in single loop mode.

- 1    Log into the system:  
     **LOGI** (password)
- 2    See if the Digitone receiver to be tested is disabled:  
     **LD 34**  
     **STAT**

The system responds with the terminal number (TN), or numbers, of any disabled Digitone receivers.

- 3    If the Digitone receiver is disabled, enable it:  
     **ENLR I s c** uloop, shelf, card, and unit numbers
- 4    Test the Digitone receiver:  
     **DTR I s c** uloop, shelf, card, and unit numbers

If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.

- 5    End the session in LD 34:  
     \*\*\*\*

**Procedure 4****Line cards**

Use this procedure to test a line card.

- 1 Log into the system:  
**LOGI** (password)
- 2 Perform a network memory test, continuity test, and signaling test on a specific loop and shelf:  
**LD 30**  
**SHLF I s** loop and shelf numbers

If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.

- 3 For a line card on a superloop, perform a signaling test on a specific card or unit:  
**UNTT I s c** loop, shelf, and card numbers

For the NT8D02 Digital Line Card, enter:

**UNTT I s c** uloop, shelf, card, and unit numbers

If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.

- 4 End the session in LD 30:  
\*\*\*\*

**Procedure 5**  
**Multifrequency sender cards**

Use this procedure to test a multifrequency sender (MFS) card or the MFS function of an NT8D17 Conference/TDS Card.

- 1      Log into the system:  
      **LOGI** (password)
- 2      Test and enable an MFS loop:  
      **LD 46**  
      **MFS loop**  
      (on the NT8D17 Conference/TDS Card, the TDS/MFS loop is the even loop of the conference/TDS loop pair)

**Note:** The conference/TDS card is not enabled automatically when it is inserted. You must enable the card with the command ENLX. (This command is used in LD 34 and LD 46 to address even loops and in LD 38 to address odd loops.) Enabling the loops with the command ENLL does not enable the hardware for the card.

If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.

- 3      Access the system from a maintenance telephone; then enter:  
      **LD 46**  
  
      Give the system approximately 20 seconds to load the program.  
  
      See "Communicating with the Meridian 1" in the *X11 input/output guide* for details on accessing the system from a maintenance telephone.
- 4      Obtain 10-second bursts of digits 1 to 9, 0, and 11 to 15 (in that order) for all digits on the specified loop:  
      **TONE loop ALL**  
  
      Each burst should sound different. If the bursts do not sound different, replace the card.
- 5      End the session in LD 46:  
      \*\*\*\*

**Procedure 6**  
**Multifrequency signaling cards**

Use this procedure to test a multifrequency signaling card.

- 1 Log into the system:  
**LOGI** (password)
- 2 Test and enable the specified unit:  
**LD 54**  
**ATST I s c** uloop, shelf, card, and unit numbers  
  
If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.
- 3 End the session in LD 54:  
\*\*\*\*

**Procedure 7**  
**Network cards**

Use this procedure to test a network card.

- 1 Log into the system:  
**LOGI** (password)
- 2 Perform a network memory test, continuity test, and signaling test:  
**LD 30**  
**LOOP loop** can be a specific loop number or ALL  
  
If ALL is specified, all enabled loops (except attendant console loops) and all shelves on each loop are tested.  
  
If only one loop is being tested and it is disabled, enter **ENLL loop** to enable and test a network card associated with the specified loop. (This command cannot enable network cards disabled by LD 32.)  
  
If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.
- 3 End the session in LD 30:  
\*\*\*\*

## Trunk cards

Use the following procedures to test a trunk card.

### Procedure 8

#### Test procedure using a maintenance telephone

- 1      Access the system from a maintenance telephone.  
  
See "Communicating with the Meridian 1" in the *X11 input/output guide* for details on accessing the system from a maintenance telephone.
- 2      Test the trunk unit:  
**LD 36**  
**TRK I s c** uloop, shelf, card, and unit numbers
- 3      If the maintenance telephone is hooked up to a monitor and the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.

### Procedure 9

#### Test procedure using a system terminal

- 1      Log into the system:  
**LOGI** (password)
- 2      Enter:  
**LD 36**
- 3      To test a trunk from a remote test center, seize a central office (CO) monitor trunk:  
**CALL**  
or  
**CALL I s c u**  
  
Seize the automatic number identification (ANI) trunk:  
**TRK I s c** uloop, shelf, card, and unit numbers  
  
When you see the **DN?** prompt, enter the directory number (DN) you want the system to dial.  
  
If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.
- 4      End the session in LD 36:  
\*\*\*\*

- 5 Test an automatically identified outward dialing (AIOD) trunk card:  
**LD 41**

**AIOD** is loop, shelf, and card numbers

If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.

- 6 End the session in LD 41:  
\*\*\*\*

### **Procedure 10**

#### **Tone and digit switch cards**

Use this procedure to test a tone and digit switch (TDS) card or to test the TDS function of an NT8D17 Conference/TDS Card.

- 1 Log into the system:  
**LOGI** (password)
- 2 Obtain a list of terminal numbers (TNs) for disabled TDS cards:  
**LD 34**  
**STAD**
- 3 If the TDS loop to be tested is disabled, enable it.  
  
For an NT8D17 Conference/TDS Card, enter:  
**ENLX loop**  
(the TDS/MFS loop is the even loop of the conference/TDS loop pair)  
  
**Note:** The conference/TDS card is not enabled automatically when it is inserted. You must enable the card with the command ENLX. (This command is used in LD 34 and LD 46 to address even loops and in LD 38 to address odd loops.) Enabling the loops with the command ENLL does not enable the hardware for the card.  
  
For other than an NT8D17 Conference/TDS Card, enter:  
**ENLL loop**
- 4 Test the TDS loop:  
**TDS loop**  
  
If the system response is other than **OK**, see the *X11 input/output guide* to analyze the messages.
- 5 End the session in LD 34:  
\*\*\*\*

- 6 Using a maintenance telephone, log into the system.  
See "Communicating with the Meridian 1" in the *X11 input/output guide* for details on accessing the system using a maintenance telephone.
- 7 From the maintenance telephone, enter:  
**LD#34##**  
To test outpulsers and channels for the TDS loop, see Table 2 for a sample of the input commands used with the maintenance telephone. See the *X11 input/output guide* for all tones that can be tested.
- 8 Exit LD 34 from the maintenance telephone:  
\*\*\*\*

**Table 2**  
**TDS tone tests**

Input command	Dial pad equivalent	Description
BSY#loop##	279#loop##	Provides busy tone from TDS loop specified.
C##	2##	Removes any active tone.
DIA#loop##	342#loop##	Provides dial tone from TDS loop specified.
OVF#loop##	683#loop##	Provides overflow tone from TDS loop specified.
RBK#loop##	725#loop##	Provides ringback tone from TDS loop specified.
RNG#loop##	764#loop##	Provides ring tone from TDS loop specified.
****		Exits TDS test program.



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## Option settings

---

### Circuit card grid

Some circuit cards contain option switches or jumpers, or both, that define specific functions. A switch or jumper may be identified by an alphanumeric coordinate (such as D29) that indicates a location on the card, or by a switch number (such as SW2) printed on the circuit board (see Figure 4). Positions on a switch (for example, positions 1, 2, 3, and 4 on SW2) are labeled on the switch block.

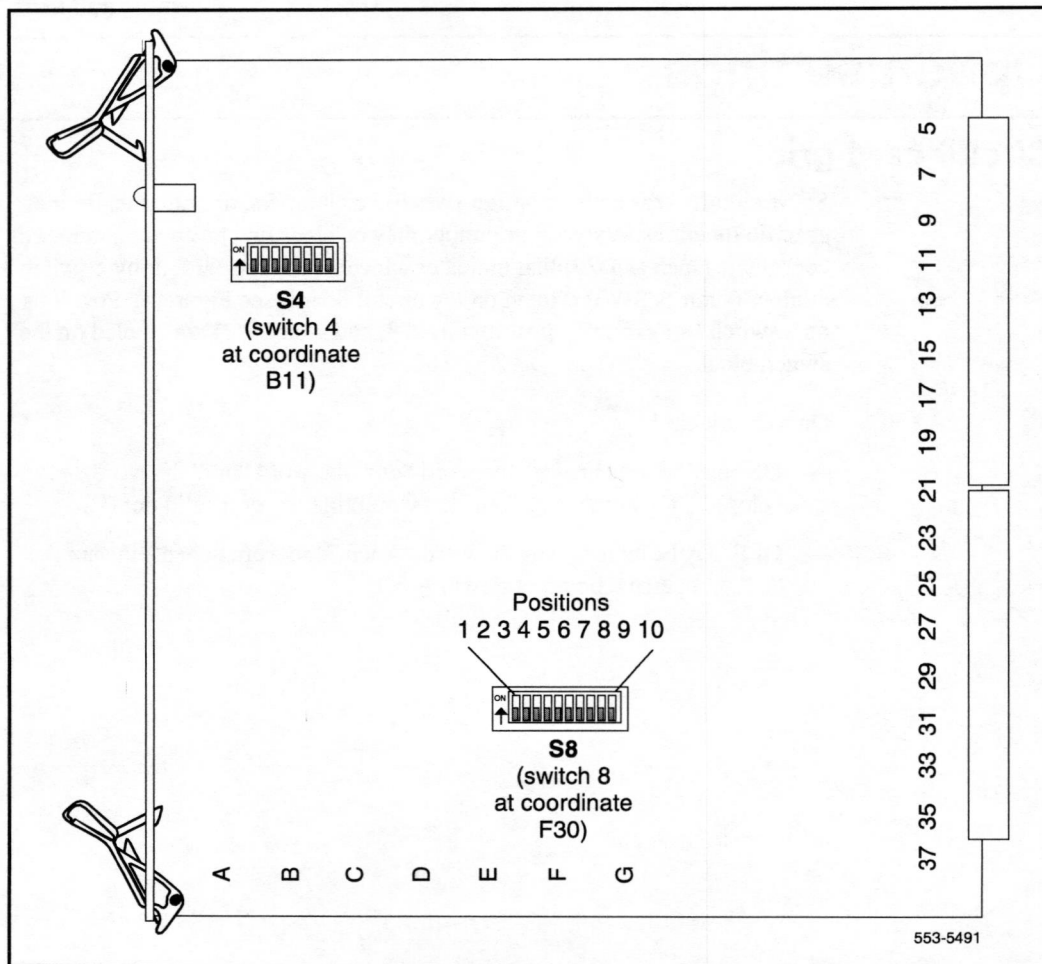
On a circuit card

- ON may be indicated by the word “on,” the word “up,” the word “closed,” the number “1,” an arrow pointing up, or a solid dot (•).
- OFF may be indicated by the word “down,” the word “open,” the number “0,” or an arrow pointing down.



Throughout this document, if neither ON nor OFF is given (there is a blank space) for a position on a switch, that position may be set to either ON or OFF because it has no function for the option described.

**Figure 4**  
**Circuit card grid**



## NT1R20 Off-Premise Station card

The following table lists option settings for the NT1R20 Off-Premise Station analog card.

**Table 3**  
**OPS analog line card configuration**

Application	On-premise station (ONS)			Off-premise station (OPS)			
Class of Service (CLS) (Note 1)	ONP			OPX			
Loop resistance (ohms)	0–460			0–2300 (Note 2)			
Jumper strap setting (Note 6)	Both JX.0 and JX.1 off			Both JX.0 and JX.1 off		Both JX.0 and JX.1 on	
Loop loss (dB) (Note 3)	0–1.5	>1.5–2.5	>2.5–3.0	0–1.5	>1.5–2.5	>2.5–4.5	>4.5–15
TIMP (Notes 1, 4)	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms
BIMP (Notes 1, 4)	600 ohms	3COM1	3COM2	600 ohms	3COM1	3COM2	3COM2
Gain treatment (Note 5)	No						Yes

**Note 1:** Configured in the Single-line Telephone Administration program (LD10).

**Note 2:** The maximum signaling range supported by the OPS analog line card is 2300 ohms.

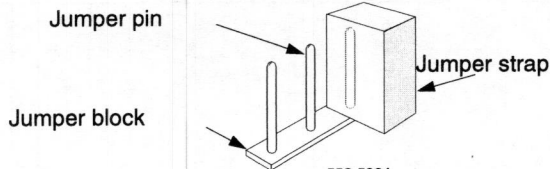
**Note 3:** Loss of untreated (no gain devices) metallic line facility. Upper loss limits correspond to loop resistance ranges for 26 AWG wire.

**Note 4:** Default software impedance settings are:

	ONP CLS	OPX CLS
<b>TIMP:</b>	600 ohms	600 ohms
<b>BIMP:</b>	600 ohms	3COM2

**Note:** Gain treatment, such as a voice frequency repeater (VFR) is required to limit the actual OPS loop loss to 4.5 dB, maximum. VFR treatment of metallic loops having untreated loss greater than 15 dB (equivalent to a maximum signaling range of 2300 ohms on 26 AWG wire) is not recommended.

**Note:** Jumper strap settings JX.0 and JX.1 apply to all eight units; "X" indicates the unit number, 0–7. "Off" indicates that a jumper strap is not installed across both pins on a jumper block. Store unused straps on the OPS analog line card by installing them on a single jumper pin as shown below:



553-5924

## NT5D12AA Dual DTI/PRI (DDP) card

Switch setting tables for this card are listed in subsections according to their function. Bold font designates factory (default) settings.

### General purpose switches

Use switch set SW9 for Trunk 0; use switch set SW15 for Trunk 1.

**Table 4**  
**General purpose switch settings**

Switch	Description	SW9/SW15 switch setting
1	Framing Mode	<b>off</b> - ESF on - SF
2	Yellow Alarm Method	<b>off</b> - FDL on - Digit2
3	Zero Code Suppression Mode	<b>off</b> - B8ZS on - AMI
4	Unused	<b>off</b>

### Trunk interface switches

A per trunk switch provides selection of T1 transmission. Use switch SW4 for Trunk 0; use switch SW10 for Trunk 1.

**Table 5**  
**Trunk interface transmission mode switch settings**

Description	SW4/SW10 switch setting
For future use	off
T1	on

A per trunk set of three switches provides selection of dB values. Use SW5, SW6, and SW7 for Trunk 0; use SW11, SW12, and SW13 for Trunk 1.

**Table 6**  
**Trunk interface line build out switch settings**

Description	Switch setting		
	SW5/SW11	SW6/SW12	SW7/SW13
0 dB	off	off	off
7.5 dB	on	on	off
15 dB	on	off	on

A per trunk set of four DIP switches provides selection among three values for receiver impedance. Use SW8 for Trunk 0; use SW14 for Trunk 1.

**Table 7**  
**Trunk interface impedance switch settings**

Description	SW8/SW14 switch settings			
75 $\Omega$	off	off	on	off
100 $\Omega$	on	off	off	on
120 $\Omega$	off	off	off	on

## Ring ground switches

A set of four DIP switches selects which Ring lines are connected to ground.

**Table 8**  
**Ring ground switch settings**

Switch	Description	S2 switch setting
1	Trunk 0 Transmit	<b>off - Ring line is not grounded</b> on - Ring line is grounded
2	Trunk 0 Receive	<b>off - Ring line is not grounded</b> on - Ring line is grounded
3	Trunk 1 Transmit	<b>off - Ring line is not grounded</b> on - Ring line is grounded
4	Trunk 1 Receive	<b>off - Ring line is not grounded</b> on - Ring line is grounded

## DCH mode and address select switches

One switch selects between an on-board NTBK51AA D-Channel daughterboard and an external MSDL/DCHI card. Four other switches provide the daughterboard address.

**Table 9**  
**DCH mode and address select switch settings**

Switch	Description	S3 Switch Setting
1-4	D-Channel daughterboard Address	See the next table.
5-7	For future use	off
8	External DCH or Onboard DDCH	<b>off - MSDL or DCHI card</b> on - Onboard DDCH daughterboard

**Table 10**  
**NTBK51AA daughterboard address select switch settings**

Device Address <sup>1</sup>	Switch Setting			
0 <sup>2</sup>	off	off	off	off
1	on	off	off	off
2	off	on	off	off
3	on	on	off	off
4	off	off	on	off
5	on	off	on	off
6	off	on	on	off
7	on	on	on	off
8	off	off	off	on
9	on	off	off	on
10	off	on	off	on
11	on	on	off	on
12	off	off	on	on
13	on	off	on	on
14	off	on	on	on
15	on	on	on	on

**Note 1:** The maximum number of DCHI, MSDL, and DDCH devices in the system is 16.

The Device Addresses are equivalent to the MSDL DNUM designations. For programming information on the MSDL, refer to NTPs *Multi-purpose Serial Data Link description* 553-3001-195 and *X11 input/output guide*.

**Note 2:** Device address 0 is commonly assigned to the System Monitor.

## Illustrations of switch locations and settings

Figure 5 below displays functional areas for switches on the DDP card.

**Figure 5**  
**Switch functions and areas**

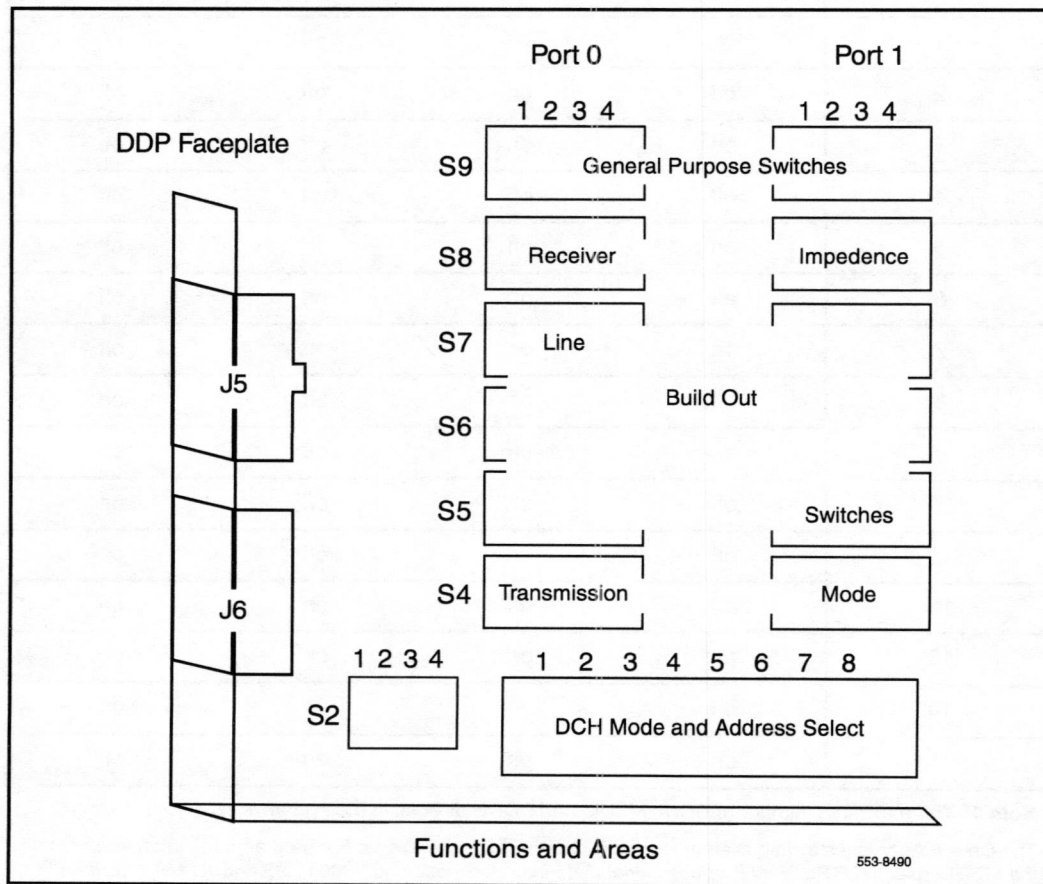
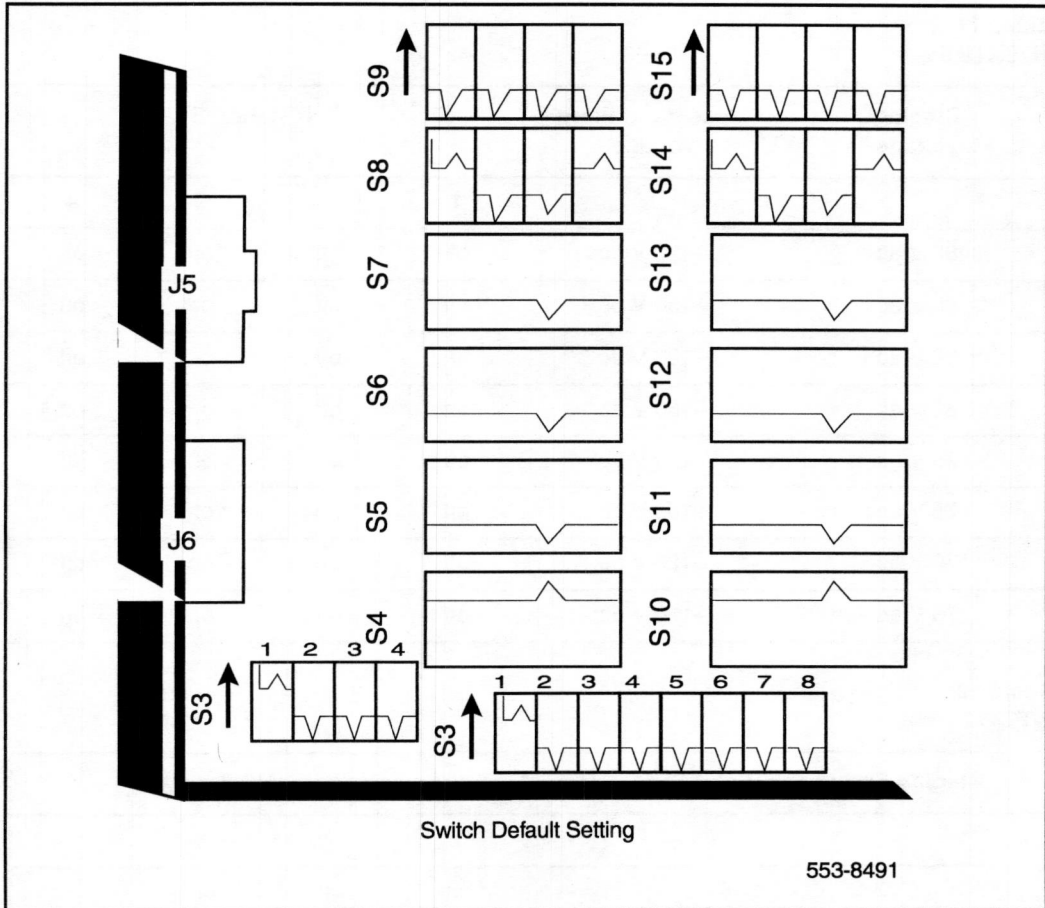




Figure 6 displays default settings for switches on the DPP card.

**Figure 6**  
**Switch default settings**



## NT5K12 Enhanced Peripheral Equipment Power Supply

The following tables show the option settings for the NT5K12 Enhanced Peripheral Equipment Power Supply.

**Table 11**  
**NT5K12 SW1**

Ringing voltage	Message waiting voltage	Switch setting SW1			
		1	2	3	4
86 V ac	-120 V dc	off	off	off	off
86 V ac	-150 V dc	off	off	off	on
80 V ac	-120 V dc	on	off	off	off
80 V ac	-150 V dc	on	off	off	on
75 V ac	-120 V dc	off	on	off	off
75 V ac	-150 V dc	off	on	off	on
70 V ac	-120 V dc	off	off	on	off
70 V ac	-150 V dc	off	off	on	on

**Table 12**  
**NT5K12 SW2**

Ringing Frequency (Hz)	Switch setting SW2		
	1	2	3
20	on	off	off
25	off	on	off
50	off	off	on

## NT6D11 and NT5K35 D-Channel Interface Card

The next three tables list option settings for the NT6D11 (vintages AA, AB, and AC) and NT5K35 DCHI Card.

**Table 13**

**NT6D11AA, AB, AC, and NT5K35 jumper settings and group selection**

Jumper settings				Address selection			
Option	Port	Socket number		Group number	Switch		
					1	2	3
DTE (terminal)	0 1	U11 U5	U9 U3	0 1	off off	off off	off on
DCE (modem)	0 1	U12 U6	U10 U4	2 3	off off	on on	off on
RS-232-C interface	0 1	U31 U25	U29 U23	4 5	on on	off off	off on
High-speed interface	0 1	U30 U24	U28 U22	6 7	on on	on on	off on

**Note:** Group and port numbers combine to define a complete port address. (The following two tables define port numbers.) There are 8 groups and 16 port numbers, for a total of 128 possible ports. Group 0 is the only group supported by Generic X11 Supplementary Features Group F (Phase 6). Therefore, when using Group F software set switches 1, 2, and 3 to OFF.

Table 14

NT6D11AA, AB, and AC port address settings for single port operation

Port number SDI/DCHI (J1/J2)	Switch						
	4	5	6	7	8	9	0
0	off	off	off	off	on	*	off
1	off	off	off	on	on	*	off
2	off	off	on	off	on	*	off
3	off	off	on	on	on	*	off
4	off	on	off	off	on	*	off
5	off	on	off	on	on	*	off
6	off	on	on	off	on	*	off
7	off	on	no	on	on	*	off
8	on	off	off	off	on	*	off
9	on	off	off	on	on	*	off
10	on	off	on	off	on	*	off
11	on	off	on	on	on	*	off
12	on	on	off	off	on	*	off
13	on	on	off	on	on	*	off
14	on	on	on	off	on	*	off
15	on	on	on	on	on	*	off

\* Set switch 9 to ON (1) to enable the SDI port and disable the DCHI port. Set switch 9 to OFF (0) to disable the SDI port and enable the DCHI port.

Table 15

NT6D11AA, AB, and AC port settings for dual port operation

Port number		Switch						
SDI (J1)	DCHI (J2)	4	5	6	7	8	9	0
0	1	off	off	off	*	off	*	off
2	3	off	off	on	*	off	*	off
4	5	off	on	off	*	off	*	off
6	7	off	on	on	*	off	*	off
8	9	on	off	off	*	off	*	off
10	11	on	off	on	*	off	*	off
12	13	on	on	off	*	off	*	off
14	15	on	on	on	*	off	*	off

\* Switches 7 and 9 do not affect dual port operation; they may be set to ON or OFF.

The next three tables list option settings for the NT6D11 (AD or later) and NT5K35 DCHI Cards.

### Protocol selection

SW3 is used to select the D-Channel protocol, as shown below.

**Table 16**  
**Protocol selection switch settings**

Protocol	Switch setting SW3	
	1	2
DPNSS1/DASS2 (NT5K35/NT5K75 Emulation)	off	off
ISDN (NT6D11AB/AC emulation)	on	on

### Port addressing modes

#### Port 0

Port 0 is used to select whether the asynchronous ESDI port is be disabled or not.

**Note:** The asynchronous ESDI port must be set to “disabled” if operating mode is set to DPNSS1/DASS2.

**Table 17**  
**Port 0 mode selection**

Protocol	Switch setting SW1	
	1	2
Not used	off	–
Asynchronous ESDI	on	off
Port disabled	on	on

**Port 1**

The table below shows valid mode combinations. If the port is disabled, it will not be visible to the system CPU.

**Table 18**  
**Port 1 settings**

Mode	Emulates	Switch setting SW2		Switch setting SW3	
		1	2	1	2
DPNSS1/DASS2	NT5K35AA (Synchronous D-Channel standard addressing)	off	off	off	off
ISDN	NT6D11AB/AC	off	off	on	on
Expanded DPNSS1/DASS2	NT5K75AA (Synchronous D-Channel standard addressing)	off	on	off	off
Port disabled		on	on	–	–
Not used		on	off	–	–

**Port address switch settings**

**Port address switch settings in the standard mode** These apply to either SW1 or SW2 when the NT6D11AD/AE is in standard mode.

*Note:* S1 and S2 should be set to OFF.

**Table 19****Port address switch settings in the standard mode**

Port address	Switch setting							
	Group number			Device number				
	S3	S4	S5	S6	S7	S8	S9	S10
0	off	off	off	off	off	off	off	x
1	off	off	off	off	off	off	on	x
2	off	off	off	off	off	on	off	x
3	off	off	off	off	off	on	on	x
4	off	off	off	off	on	off	off	x
5	off	off	off	off	on	off	on	x
6	off	off	off	off	on	on	off	x
7	off	off	off	off	on	on	on	x
8	off	off	off	on	off	off	off	x
9	off	off	off	on	off	off	on	x
10	off	off	off	on	off	on	off	x
11	off	off	off	on	off	on	on	x
12	off	off	off	on	on	off	off	x
13	off	off	off	on	on	off	on	x
14	off	off	off	on	on	on	off	x
15	off	off	off	on	on	on	on	x



**Port address switch settings in the expanded mode** These settings only apply to SW2 (that is, the D-Channel port). Note that addresses 3D00H–3FFFH are never used.

**Table 20****Port address switch settings in the expanded mode (Part 1 of 2)**

Port address	Switch setting							
	Half group number			Device number				
	S3	S4	S5	S6	S7	S8	S9	S10
0	off	off	off	off	off	off	off	off
1	off	off	off	off	off	off	off	on
2	off	off	off	off	off	off	on	off
3	off	off	off	off	off	off	on	on
4	off	off	off	off	off	on	off	off
5	off	off	off	off	off	on	off	on
6	off	off	off	off	off	on	on	off
7	off	off	off	off	off	on	on	on
8	off	off	off	off	on	off	off	off
9	off	off	off	off	on	off	off	on
10	off	off	off	off	on	off	on	off
11	off	off	off	off	on	off	on	on
12	off	off	off	off	on	on	off	off
13	off	off	off	off	on	on	off	on
14	off	off	off	off	on	on	on	off
15	off	off	off	off	on	on	on	on

**Table 20**  
**Port address switch settings in the expanded mode (Part 2 of 2)**

Port address	Switch setting							
	Half group number			Device number				
	S3	S4	S5	S6	S7	S8	S9	S10
16	off	off	off	on	off	off	off	off
17	off	off	off	on	off	off	off	on
18	off	off	off	on	off	off	on	off
19	off	off	off	on	off	off	on	on
20	off	off	off	on	off	on	off	off
21	off	off	off	on	off	on	off	on
22	off	off	off	on	off	on	on	off
23	off	off	off	on	off	on	on	on
24	off	off	off	on	on	off	off	off
25	off	off	off	on	on	off	off	on
26	off	off	off	on	on	off	on	off
27	off	off	off	on	on	off	on	on
28	off	off	off	on	on	on	off	off
29	off	off	off	on	on	on	off	on
30	off	off	off	on	on	on	on	off
31	off	off	off	on	on	on	on	on
32–63	off	off	on	Use same settings as for port addr. 0–31				
64–95	off	on	off	Use same settings as for port addr. 0–31				
96–127	off	on	on	Use same settings as for port addr. 0–31				
128–159	on	off	off	Use same settings as for port addr. 0–31				

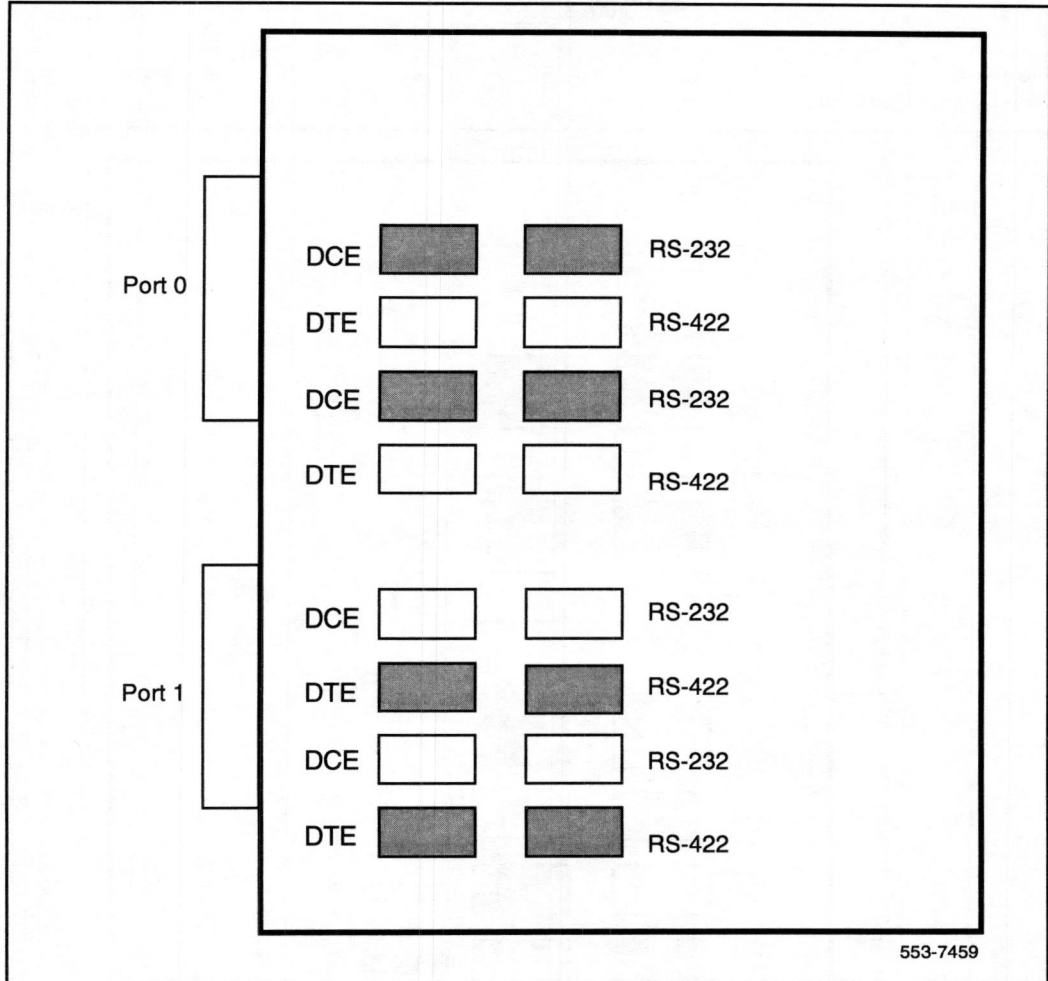
## **Jumper settings**

The NT6D11AD/AE has two banks of option straps, one for each port. These select between DCE and DTE operation and whether the signaling interface is RS232 (APNSS or asynchronous) or RS422 (DPNSS1/DASS2).

### **DPNSS1/DASS2 configuration**

The DPNSS1/DASS2 configuration is shown in Figure 7.

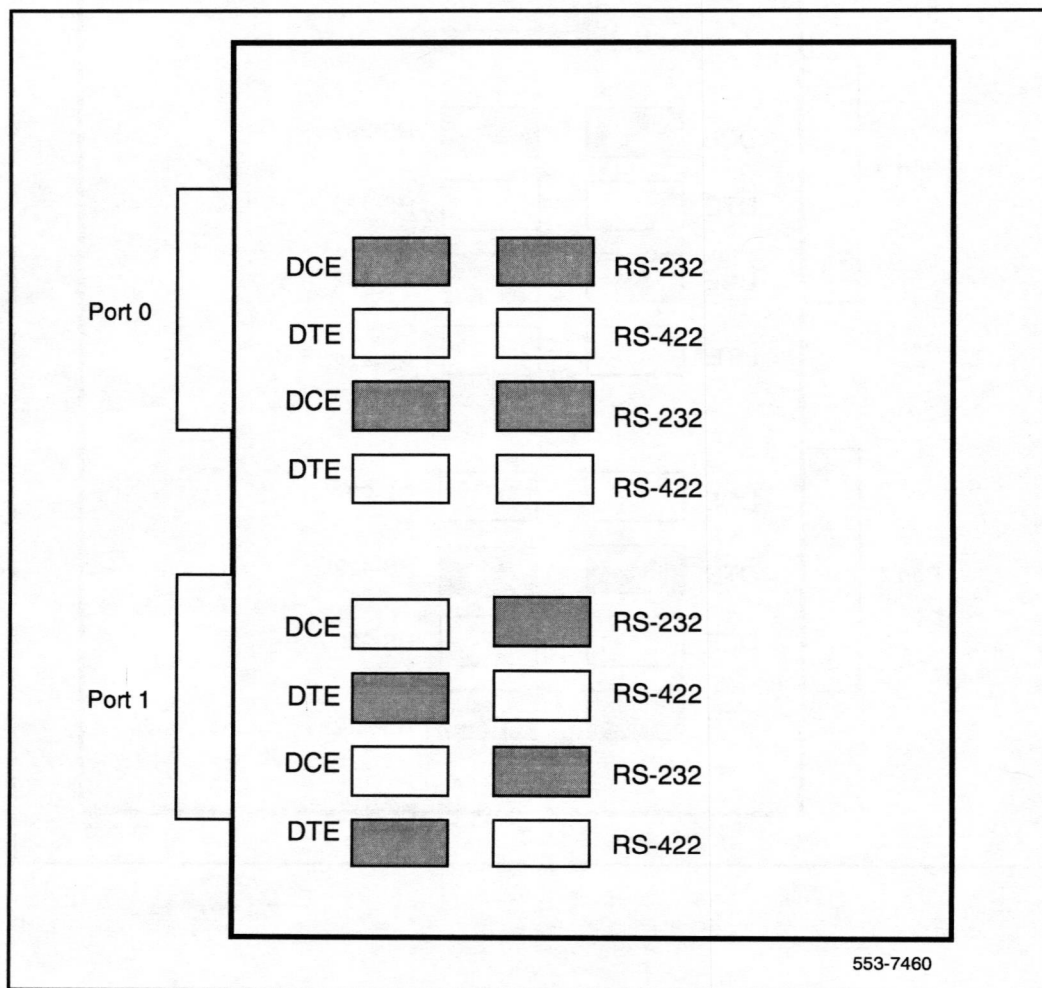
**Figure 7**  
**DPNSS1/DASS2 configuration**



### APNSS configuration

For APNSS via modem low speed and DTE connection, insert Port 1 straps, as illustrated by Figure 8.

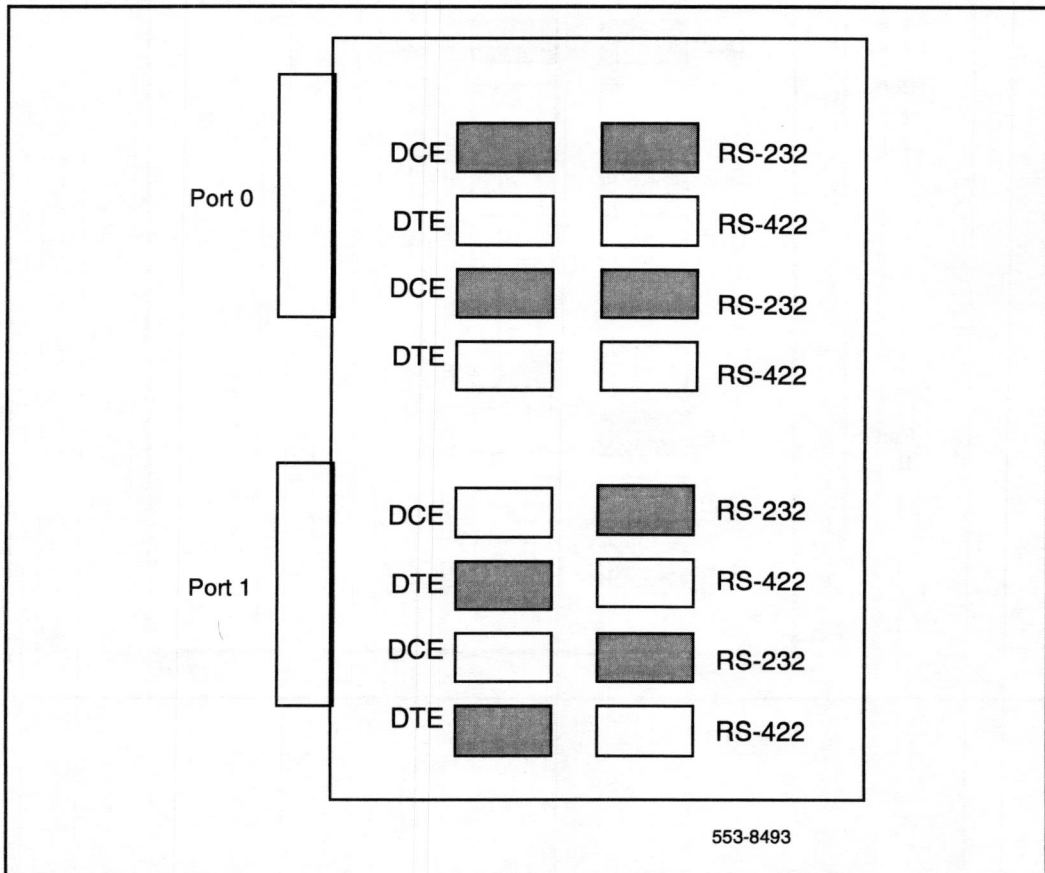
**Figure 8**  
**APNSS configuration**



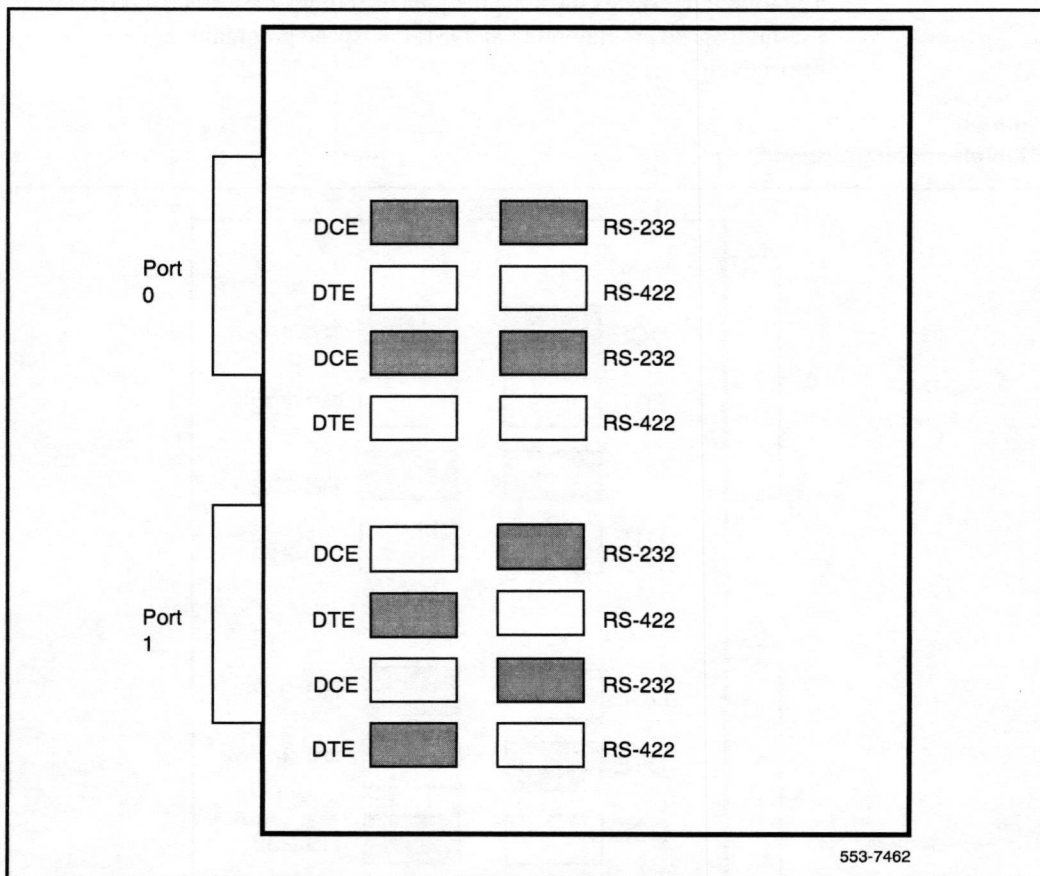
## ISDN PRI Configuration

The following figures illustrate the jumper settings for the NT6D11AD with ISL high-speed programming and ISL low-speed programming, respectively.

**Figure 9**  
**ISL high-speed programming**



**Figure 10**  
**ISL low-speed programming**





## NT6D42 Ringing Generator DC

The next six tables list option settings for the NT6D42 Ringing Generator.

**Table 21**

**NT6D42 recommended options for North American and British Telecom**

Application	Ringing frequency	Ringing voltage	Jumper locations	Ringing output
North America	20 Hz	86 V ac	P5 High voltage message waiting	Low impedance
British Telecom	25 Hz	80 V ac	P4 No high voltage message waiting	Low impedance

**Table 22**

**NT6D42 jumper locations P4 and P5**

High voltage message waiting	Pin location
Disable	Jumper in P4
Enable	Jumper in P5
<b>Note:</b> One jumper must be installed.	

**Table 23**

**NT6D42 jumper location J7**

Ringing output	Jumper location J7
Low impedance (normal)	Connect pins 1 and 2
High impedance (Australia)	Connect pins 2 and 3

**Table 24**  
**NT6D42 SW1**

<b>Ringing frequency (Hz)</b>	<b>Position SW1</b>
20	1
25	2
50	3

**Table 25**  
**NT6D42CB SW2**

<b>Ringing voltage</b>	<b>Message waiting voltage</b>	<b>SW2</b>			
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
86 V ac	-120 V dc	off	off	off	off
86 V ac	-150 V dc	off	off	off	on
80 V ac	-120 V dc	on	off	off	off
80 V ac	-150 V dc	on	off	off	on
75 V ac	-120 V dc	off	on	off	off
75 V ac	-150 V dc	off	on	off	on
70 V ac	-120 V dc	off	off	on	off
70 V ac	-150 V dc	off	off	on	on

**Table 26****Table 27NT6D42CC SW2**

Ringing voltage	Message waiting voltage	SW2			
		1	2	3	4
86 V ac	−100 V dc	off	off	off	off
86 V ac	−150 V dc	off	off	off	on
80 V ac	−100 V dc	on	off	off	off
80 V ac	−150 V dc	on	off	off	on
75 V ac	−100 V dc	off	on	off	off
75 V ac	−150 V dc	off	on	off	on
70 V ac	−100 V dc	off	off	on	off
70 V ac	−150 V dc	off	off	on	on

## NT6D43 CE/PE Power Supply DC

The next five tables list option settings for the NT6D43 Power Supply.

**Note:** For installations outside of North America, a jumper on the motherboard (at J5) and switches on the daughterboard must be set to select the ringing frequency or voltage and to enable or disable Message Waiting lamps. The daughterboard must be removed to access the switches. To remove the daughterboard, remove the screws on either side of the motherboard and carefully slide out the daughterboard.

**Table 28**

**NT6D43 recommended options for North America and British Telecom**

Application	Ringing frequency	Ringing voltage	Message Waiting	Ringing output
North America	20 Hz	86 V ac	Enabled (-150 V dc)	Low impedance
British Telecom	20 Hz	80 V ac	Disabled	Low impedance

**Table 29**

**NT6D43 jumper locations P4 and P5**

Message Waiting lamp	Pin location
Enabled	Jumper in E1
Disabled	Jumper in E2
<b>Note:</b> One jumper must be installed.	

**Table 30**

**NT6D43 jumper location J5**

Ringing output	Jumper location J5 (motherboard)
Low impedance (normal)	Connect pins 1 and 2
High impedance (Australia)	Connect pins 2 and 3

**Table 31**  
**NT6D43 SW1**

Ringing frequency (Hz)	SW1		
	1	2	3
20	on	off	off
25	off	on	off
50	off	off	on

**Table 32**  
**NT6D43 SW2**

Ringing voltage	Message waiting voltage	SW2			
		1	2	3	4
86 V ac	-120 V dc	off	off	off	off
86 V ac	-150 V dc	on	off	off	off
80 V ac	-120 V dc	off	off	off	on
80 V ac	-150 V dc	on	off	off	on
75 V ac	-120 V dc	off	off	on	off
75 V ac	-150 V dc	on	off	on	off
70 V ac	-120 V dc	off	on	off	off
70 V ac	-150 V dc	on	on	off	off

**NT5D2101/NT9D1102 Core/Network Module Backplane**

Jumper	Location (between slots)	Core/Network 1	Core/Network 0
JB1	14/15	Jumper plug not installed	Plug installed
<b>Note:</b> Berg jumper is located at the bottom of the primary side of the backplane. (This is inside the card cage assembly.)			

**NT6D68 Core Module Backplane**

Jumper	Location (between slots)	Core 1	Core 0
JB4	9 / 10	Jumper plug not installed	Plug installed
JB3	10 / 11	Plug installed	Plug installed
JB2	11 / 12	Plug installed	Plug installed
JB1	12 / 13	Plug installed	Plug installed
<b>Note:</b> Berg jumpers are located along the bottom of the primary side of the backplane. (This is inside the card cage assembly.)			

**NT6D6003 Core Bus Terminator Card**

Jumper	Location	Core 1	Core 0
J5	A21	Jumper plug not installed	Jumper plug not installed
J4	A25	Jumper plug not installed	Jumper plug not installed
J3	A28	Jumper plug not installed	Jumper plug not installed
J2	A30	Jumper plug not installed	Jumper plug not installed
J1	A35	Jumper plug not installed	Jumper plug not installed
<b>Note 1:</b> All jumpers are preset to closed (the two pins are connected together by a jumper plug) and must be left closed.			
<b>Note 2:</b> Jumper J5 may not be present.			
<b>Note 3:</b> There are four LEDs on the component side (not on the faceplate) of the card. In Core 0, all of the LEDs should be off. In Core 1, the top LED should be on and the other three should be off. The pattern of the LEDs matches the jumper settings on the Core Module backplane.			

## NT6D80 Multi-purpose Serial Data Link Card

RS-232-D DTE or DCE* RS-422-A DTE (terminal) RS-422-A DCE (modem)	<b>Port 0—SW4</b>  all off all off all on	<b>Port 0—SW8</b>  all off all on all off
RS-232-D DTE or DCE* RS-422-A DTE RS-422-A DCE	<b>Port 1—SW3</b>  all off all off all on	<b>Port 1—SW7</b>  all off all on all off
RS-232-D DTE or DCE* RS-422-A DTE RS-422-A DCE	<b>Port 2—SW2</b>  all off all off all on	<b>Port 2—SW6</b>  all off all on all off
RS-232-D DTE or DCE* RS-422-A DTE RS-422-A DCE	<b>Port 3—SW1</b>  all off all off all on	<b>Port 3—SW5</b>  all off all on all off

\* RS-232-D DTE and DCE modes are software configured. RS-422-A DTE and DEC modes are switch configured.

**Note:** The device number for the MSDL card is configured in LD17 at the prompt DNUM. You must also set the device number, using switches S9 and S10, on the MSDL card. S9 designates ones and S10 designates tens. To set the device number as 14, for example, set S10 to 1 and S9 to 4.



**NT7D03 Ringing Generator DC**

Frequency Hz	Volts RMS	Switch S300			
		1	2	3	4
20	86	off	off	off	off
20	80	off	off	off	on
25	86	on	off	off	off
25	80	on	off	off	on
25	70	off	on	off	off
50	86	off	on	off	on
50	80	off	off	on	off
50	70	off	off	on	on

**NT7D04 CE/PE Power Supply DC**

Frequency Hz	Volts RMS	Switch S300			
		1	2	3	4
20	86	off	off	off	*
20	80	on	off	off	*
25	86	off	on	off	*
25	80	on	on	off	*
25	70	off	off	on	*
50	86	on	off	on	*
50	80	off	on	on	*
50	70	on	on	on	*

\* Not applicable, can be ON or OFF.

## NT8D14 Universal Trunk Card

The next five tables list option settings for the NT8D14 Universal Trunk Card.

**Table 33**  
**NT8D14 vintage AA jumper strap settings**

Modes	Location	Jumper strap
Central Office (CO)	J1, J2	off
2-way tie trunk (loop dial repeat)	J1, J2	off
2-way tie trunk (outgoing/incoming dial)	J1, J2	off
Recorded announcement (RAN)	J1, J2	off
Paging trunk	J1, J2	off
Japan CO/DID operation	J1, J2	off
DID operation: loop length $\geq 2000 \frac{3}{4}$	J1, J2	on
DID operation: loop length $< 2000 \frac{3}{4}$	J1, J2	off
<b>Note 1:</b> off = no strap present.		
<b>Note 2:</b> Locations (J1, J2) apply to all eight units.		

**Table 34****NT8D14 vintages BA/BB jumper strap settings—factory standard**

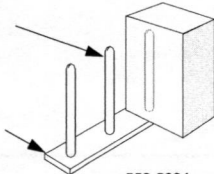
Trunk types	Loop length	Jumper strap settings			
		J1.X	J2.X	J3.X	J4.X
CO/FX/WATS	Zero–1524 m (5000 ft)	Off	Off	1–2	1–2
2-way tie (LDR)					
2-way tie (OAID)					
DID	Zero–600 ohms				
RAN: continuous operation mode	Not applicable: RAN and paging trunks should not leave the building.				
Paging					

**Note:** Jumper strap settings J1.X, J2.X, J3.X, and J4.X apply to all eight units; “X” indicates the unit number, 0–7. “Off” indicates that no jumper strap is installed on a jumper block. Store unused straps on the universal trunk card by installing them on a single jumper pin as shown below:

Jumper pin

Jumper block

Jumper strap



553-5924

**Table 35****NT8D14 vintages BA/BB jumper strap settings—extended range**

Trunk types	Loop length	Jumper strap settings			
		J1.X	J2.X	J3.X	J4.X
CO/FX/WATS	> 1524 m (5000 ft)	Off	Off	1–2	2–3
2-way tie (LDR)					
2-way tie (OAID)					
DID	> 600 ohms	On	On	1–2	2–3
RAN: pulse start or level start modes	Not applicable: RAN trunks should not leave the building.	Off	Off	2–3	1–2

**Note:** Jumper strap settings J1.X, J2.X, J3.X, and J4.X apply to all eight units; "X" indicates the unit number, 0–7. "Off" indicates that no jumper strap is installed on a jumper block.

**Table 36**  
**NT8D14 vintages BA/BB trunk types—termination impedance and balance network**

Trunk types	Terminating impedance (Note 1)	Balance network for loop lengths (Note 2)		
		Zero–915 m (zero–3000 ft)	915–1524 m (3000–5000 ft)	> 1524 m (> 5000 ft)
CO/FX/WATS	600 or 900 ohms	600 ohms	3COM1	3COM2
2-way tie (LDR)	600 or 900 ohms	600 ohms	3COM1	3COM2
2-way tie (OAID)	600 or 900 ohms	600 ohms	3COM1	3COM2
DID (loop < 600 ohms)	600 or 900 ohms	600 ohms	3COM1	3COM2
DID (loop $\leq$ 600 ohms)	600 or 900 ohms	600 ohms	N/A	3COM2
RAN: continuous operation mode	600 or 900 ohms	600 or 900 ohms	N/A	N/A
Paging	600 ohms	600 ohms	N/A	N/A

**Note 1:** The terminating impedance of each trunk unit is software selectable in LD14 and should match the nominal impedance of the connecting equipment.

**Note 2:** The balance network of each trunk unit is software selectable between resistive 600 or 900 ohms or 3COM and is jumper selectable between 3COM1 and 3COM2.

**Table 37**  
**NT8D14 vintages BA/BB cable loop resistance and loss**

Cable length	Cable loop resistance (ohms)			Cable loop loss (dB) (non-loaded at 1 kHz)		
	22 AWG	24 AWG	26 AWG	22 AWG	24 AWG	26 AWG
915 m (3000 ft)	97	155	251	0.9	1.2	1.5
1524 m (5000 ft)	162	260	417	1.6	2.0	2.5
2225 m (7300 ft)	236	378	609	2.3	3.0	3.7
3566 m (11700 ft)	379	607	977	3.7	4.8	6.0
5639 m (18500 ft)	600	960	1544	5.9	7.6	9.4

**NT8D15 E&M Trunk Card**

Jumper (Note 1)	Mode of operation (Note 2)					
	2-wire trunk		4-wire trunk			
	Type I	Paging	Type I	Type II	DX tip & ring pair	
					M—rcv M—xmt	E—rcv M—xmt
J1.X	off	off	off	off	Pins 1–2	Pins 2–3
J2.X	on	on (Note 3)	on	on	off	off
J3.X	off	off	off	off	(Note 4)	(Note 4)
J4.X	off	off	off	off	Pins 2–3	Pins 1–2
J5.X	off	off	off	off	(Note 4)	(Note 4)
J6.X	off	off	off	off	on	on
J7.X	off	off	off	off	on	on
J8.X	off	off	off	off	on	on
J9.X	Pins 2–3	Pins 2–3	Pins 2–3	Pins 2–3	Pins 1–2	Pins 1–2
<p><b>Note 1:</b> Jumper strap settings J1.X through J9.X apply to all 4 units; "X" indicates the unit number, 0–3.</p> <p><b>Note 2:</b> Off indicates that no jumper strap is installed on a jumper block.</p> <p><b>Note 3:</b> Paging trunk mode is not zone selectable.</p> <p><b>Note 4:</b> Jumper strap installed in this location only if external loop resistance exceeds 2500 ohms.</p> <p><b>Note 5:</b> Dot next to the jumper block indicates pin 1.</p>						

**NT8D17 Conference/TDS Card**

Switch and jumper settings are used to select the companding law and to change the conference attenuation PAD levels. These PAD levels are used if prompt CPAD = 1 in LD97. The J1 connector on the faceplate is reserved for future use.

You can enable or disable a warning tone for conference calls. When the option is enabled, the tone lets callers know they are entering a conference call. The switch for this option is preset to disable the warning tone.

Companding law	Jumper at J3		
$\mu$ -law (North America), A-law	connect pins 2 and 3		
Special cases	connect pins 1 and 2		
Attenuation levels	SW2 (see Note)		
	1	2	3
12.2 db	on	on	on
10.4 db	on	on	off
8.2 db	off	on	on
7.2 db	off	on	off
5.4 db	on	off	on
4.0 db	on	off	off
1.2 db	off	off	on
0 db	off	off	off
<b>Note:</b> Set position 4 to ON to disable the warning tone option. When the warning tone is enabled, select the warning tone level as shown below.			
Level	Jumper at J2		
24 db	connect pins 1 and 2		
30 db	connect pins 2 and 3		



## NT8D21 Ringing Generator AC

Frequency	Amplitude	Settings		
		P1	P2	P3
20 Hz	86 V ac	open	open	2-5 8-11
25 Hz	70 V ac	open	1-4 7-10	open
25 Hz	80 V ac	open	3-6 9-12	open
25 Hz	86 V ac	open	2-5 8-11	open
50 Hz	70 V ac	1-4 7-10	open	open
50 Hz	80 V ac	3-6 9-12	open	open



## NT8D22 System Monitor

The master system monitor, located in the column with CPU 0, must be numbered 0. Slave system monitors are numbered from 1 to 63.

For examples of system monitor option settings in basic configurations, see “Sample settings for NT8D22 System Monitors.”

Configure the system monitor in Remote Peripheral Equipment (RPE) columns as slaves. There is no serial connection between RPE columns.

**Table 38**  
**NT8D22 SW1**

SW1 function	Position							
	1	2	3	4	5	6	7	8
Hybrid system* Meridian 1 columns only	on off							
Position 1 is OFF (Meridian 1 columns only) Position 1 is ON, all columns are PE Position 1 is ON, master column contains CPU:    master slaves		off off on off						
DC-powered system AC-powered system			on off					
PFTU is activated by this column due to over-temperature PFTU is not activated by this column				on off				
Position 1 is OFF (Meridian 1 columns only) Operation with ST, STE, or RT Operation with all other SL-1 systems					off on off			
Position 1 is OFF (Meridian 1 columns only) Operation with ST, STE, or RT Operation with all other SL-1 systems  ST, STE, or RT and PE columns (CPU in cabinet) All other SL-1 systems and PE columns (CPU in cabinet) Any hybrid system and CE and PE columns (CPU in Meridian 1 column) Meridian 1 columns only						off on off	on on off off	on off on off
* Hybrid systems are a combination of SL-1 cabinets and Meridian 1 columns.								

**Table 39**  
**NT8D22 SW2**

SW2 indication	Position							
	1	2	3	4	5	6	7	8
Master system monitor Slave system monitor	on off							
Operation with ST, STE, or RT All other operation		on off						
For master, indicates total number of slaves			Set 3–8 according to the table titled “NT8D22 settings for total number of slaves—SW2 on master.”					
For each slave, indicates the slave address			Set 3–8 according to the table titled “NT8D22 slave address—SW2 on slave.”					

**Table 40**  
**NT8D22 SW3**

SW3 indication		Position			
		1	2	3	4
CTA	master slave	on off			
CTR	master slave		on off		
FAIL	master slave			on off	
MAJOR	master slave				on off

**Table 41**  
**NT8D22 settings for total number of slaves—SW2 on master**

How many slave units	Switch position						How many slave units	Switch position					
	3	4	5	6	7	8		3	4	5	6	7	8
0	on	on	on	on	on	on	32	off	on	on	on	on	on
1	on	on	on	on	on	off	33	off	on	on	on	on	off
2	on	on	on	on	off	on	34	off	on	on	on	off	on
3	on	on	on	on	off	off	35	off	on	on	on	off	off
4	on	on	on	off	on	on	36	off	on	on	off	on	on
5	on	on	on	off	on	off	37	off	on	on	off	on	off
6	on	on	on	off	off	on	38	off	on	on	off	off	on
7	on	on	on	off	off	off	39	off	on	on	off	off	off
8	on	on	off	on	on	on	40	off	on	off	on	on	on
9	on	on	off	on	on	off	41	off	on	off	on	on	off
10	on	on	off	on	off	on	42	off	on	off	on	off	on
11	on	on	off	on	off	off	43	off	on	off	on	off	off
12	on	on	off	off	on	on	44	off	on	off	off	on	on
13	on	on	off	off	on	off	45	off	on	off	off	on	off
14	on	on	off	off	off	on	46	off	on	off	off	off	on
15	on	on	off	off	off	off	47	off	on	off	off	off	off
16	on	off	on	on	on	on	48	off	off	on	on	on	on
17	on	off	on	on	on	off	49	off	off	on	on	on	off
18	on	off	on	on	off	on	50	off	off	on	on	off	on
19	on	off	on	on	off	off	51	off	off	on	on	off	off
20	on	off	on	off	on	on	52	off	off	on	off	on	on
21	on	off	on	off	on	off	53	off	off	on	off	on	off
22	on	off	on	off	off	on	54	off	off	on	off	off	on
23	on	off	on	off	off	off	55	off	off	on	off	off	off
24	on	off	off	on	on	on	56	off	off	off	on	on	on
25	on	off	off	on	on	off	57	off	off	off	on	on	off
26	on	off	off	on	off	on	58	off	off	off	on	off	on
27	on	off	off	on	off	off	59	off	off	off	on	off	off
28	on	off	off	off	on	on	60	off	off	off	off	on	on
29	on	off	off	off	on	off	61	off	off	off	off	on	off
30	on	off	off	off	off	on	62	off	off	off	off	off	on
31	on	off	off	off	off	off	63	off	off	off	off	off	off

**Table 42**  
**NT8D22 slave address—SW2 on slave**

Slave unit address	Position						Slave unit address	Position					
	3	4	5	6	7	8		3	4	5	6	7	8
1	on	on	on	on	on	off	33	off	on	on	on	on	off
2	on	on	on	on	off	on	34	off	on	on	on	off	on
3	on	on	on	on	off	off	35	off	on	on	on	off	off
4	on	on	on	off	on	on	36	off	on	on	off	on	on
5	on	on	on	off	on	off	37	off	on	on	off	on	off
6	on	on	on	off	off	on	38	off	on	on	off	off	on
7	on	on	on	off	off	off	39	off	on	on	off	off	off
8	on	on	off	on	on	on	40	off	on	off	on	on	on
9	on	on	off	on	on	off	41	off	on	off	on	on	off
10	on	on	off	on	off	on	42	off	on	off	on	off	on
11	on	on	off	on	off	off	43	off	on	off	on	off	off
12	on	on	off	off	on	on	44	off	on	off	off	on	on
13	on	on	off	off	on	off	45	off	on	off	off	on	off
14	on	on	off	off	off	on	46	off	on	off	off	off	on
15	on	on	off	off	off	off	47	off	on	off	off	off	off
16	on	off	on	on	on	on	48	off	off	on	on	on	on
17	on	off	on	on	on	off	49	off	off	on	on	on	off
18	on	off	on	on	off	on	50	off	off	on	on	off	on
19	on	off	on	on	off	off	51	off	off	on	on	off	off
20	on	off	on	off	on	on	52	off	off	on	off	on	on
21	on	off	on	off	on	off	53	off	off	on	off	on	off
22	on	off	on	off	off	on	54	off	off	on	off	off	on
23	on	off	on	off	off	off	55	off	off	on	off	off	off
24	on	off	off	on	on	on	56	off	off	off	on	on	on
25	on	off	off	on	on	off	57	off	off	off	on	on	off
26	on	off	off	on	off	on	58	off	off	off	on	off	on
27	on	off	off	on	off	off	59	off	off	off	on	off	off
28	on	off	off	off	on	on	60	off	off	off	off	on	on
29	on	off	off	off	on	off	61	off	off	off	off	on	off
30	on	off	off	off	off	on	62	off	off	off	off	off	on
31	on	off	off	off	off	off	63	off	off	off	off	off	off
32	off	on	on	on	on	on							

**NT8D41AA Dual Port Serial Data Interface Paddle Board**

The next three tables list option settings for the NT8D41AA SDI Paddle Board.

**Table 43**  
**NT8D41 port addresses**

Device number		SW4			
Port 1	Port 2	1	2	3	4
0	1	off	on	on	on
2	3	off	on	on	off
4	5	off	on	off	on
6	7	off	on	off	off
8	9	off	off	on	on
10	11	off	off	on	off
12	13	off	off	off	on
14	15	off	off	off	off

**Table 44**  
**NT8D41 baud rate**

Baud rate	Port 1—SW2				Port 2—SW3			
	1	2	3	4	1	2	3	4
150	off	off	on	on	off	off	on	on
300	off	on	off	on	off	on	off	on
600	off	off	off	on	off	off	off	on
1200	off	on	on	off	off	on	on	off
2400	off	off	on	off	off	off	on	off
4800	off	on	off	off	off	on	off	off
9600	off	off	off	off	off	off	off	off

**Table 45**  
**NT8D41AA DTE/DCE/Fiber switch setting**

Mode	Port 1—SW5						Port 1—SW6					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	on	on	on	off	off	off	off	off	off
DCE (modem)	off	off	off	off	off	off	on	off	on	on	on	on
NT1P61 (Fibre)	on	on	on	on	off	off	off	off	on	on	on	on
	Port 2—SW7						Port 2—SW8					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	on	on	on	off	off	off	off	off	off
DCE (modem)	off	off	off	off	off	off	on	off	on	on	on	on
NT1P61 (Fiber)	on	on	on	on	off	off	off	off	on	on	on	on



**NT8D41BA Quad Serial Data Interface Paddle Board****Baud rate**

Switches SW13, SW10, SW11, and SW12 determine the baud rate for ports 1, 2, 3, and 4, respectively. See the settings for these switches in the following table.

**Table 46**  
**NT8D41BA baud rate switch settings**

Baud rate	Baud Clock (kHz)	SW13 (port 1), SW10 (port 2), SW11 (port 3), SW12 (port 4)			
		1	2	3	4
150	2.40	on	off	on	on
300	4.80	on	on	off	on
600	9.60	on	off	off	on
1,200	19.20	on	on	on	off
2,400	38.40	on	off	on	off
4,800	76.80	on	on	off	off
9,600	153.60	on	off	off	off
19,200*	307.20	on	on	on	on

\* For future use.



**Address**

Switch SW15 or SW16 and logic on the card always address the four UARTs using a pair of addresses: 0 and 1, 2 and 3 through 14 and 15. The settings for both switches are shown in the following table. To avoid system problems, switches SW15 and SW16 must not be configured identically.

**Table 47**  
**NT8D41BA address switch settings**

SW15	Port 1	Port 2	Switch settings							
SW16	Port 3	Port 4	1*	2 <sup>+</sup>	3	4	5	6	7	8
Device pair addresses	0	1	E	X	off	off	off	off	off	off
	2	3	E	X	off	off	off	off	off	on
	4	5	E	X	off	off	off	off	on	off
	6	7	E	X	off	off	off	off	on	on
	8	9	E	X	off	off	off	on	off	off
	10	11	E	X	off	off	off	on	off	on
	12	13	E	X	off	off	off	on	on	off
	14	15	E	X	off	off	off	on	on	on

\* To enable ports 1 and 2, set SW15 position 1 to ON. To enable ports 3 and 4, set SW16 position 1 to ON.

<sup>+</sup> For each X, the setting for this switch makes no difference, because it is not used.

**DTE/DCE/Fiber mode**

Each serial port can be configured to connect to a terminal (DTE equipment), a modem (DCE equipment), or a Fiber Superloop Network card. Instructions for setting the switches SW2, SW3, SW4, SW5, SW6, SW7, SW8, and SW9 are shown in the following table.

Example: Port 1 is changed from DTE to DCE by reversing every switch position on SW3 and SW2; i.e., switches that were off for DTE are turned on for DCE, and switches that were on for DTE are turned off for DCE.

**Table 48**  
**NT8D41BA DTE/DCE/Fiber switch settings**

Mode	Port 1 — SW 3						Port 1 — SW 2					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off
NT1P61 (Fiber)	on	on	on	on	on	off	on	on	on	off	on	off
Mode	Port 2 — SW 5						Port 2 — SW 4					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off
NT1P61 (Fiber)	on	on	on	on	on	off	on	on	on	off	on	off
Mode	Port 3 — SW 7						Port 3 — SW 6					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off
NT1P61 (Fiber)	on	on	on	on	on	off	on	on	on	off	on	off
Mode	Port 4 — SW 9						Port 4 — SW 8					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off
NT1P61 (Fiber)	on	on	on	on	on	off	on	on	on	off	on	off

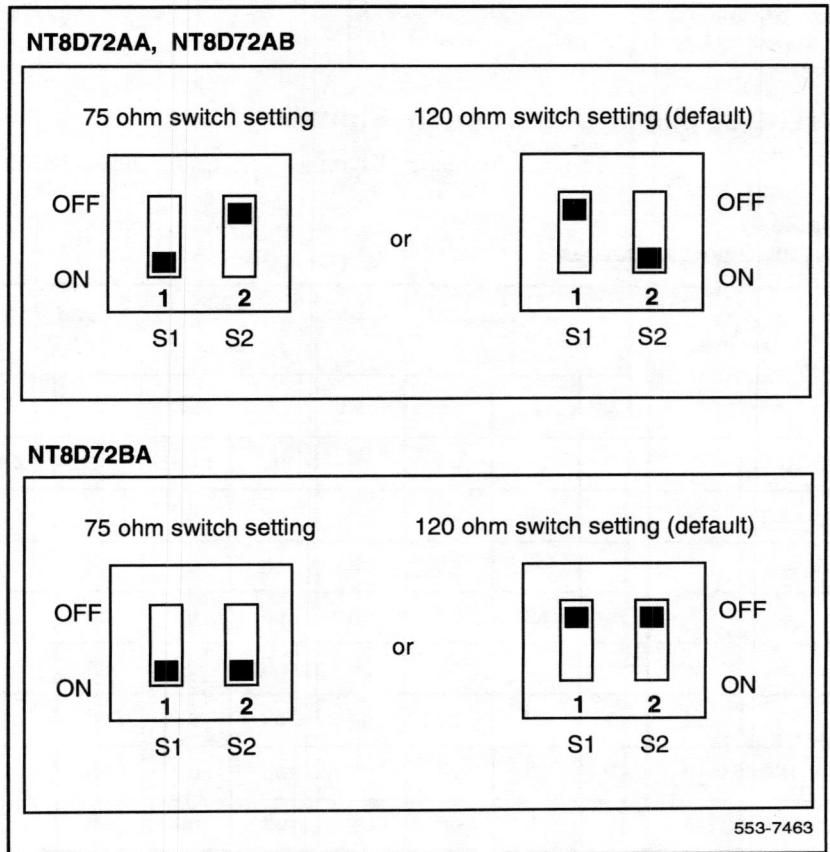
**NT9D34 Enhanced Mass Storage Interface Card**

Options	Switch S2							
	1	2	3	4	5	6	7	8
3.5-inch disk drives only	on	off	off	off	on	off	*	**
3.5-inch disk drives and the hard drive	on	off	off	on	on	off	*	**
<p>* For 4 Mbyte set to ON. For 2 Mbyte set to OFF.</p> <p>**For STE and 21E, set to on when the NTND01 Integrated CPU/Memory (ICM) Card is installed. For all other systems set to off.</p>								

## NT8D72 Primary Rate Interface Card

The NT8D72 Primary Rate Interface card allows the setting of interface impedance by way of DIP switches.

**Figure 11**  
**NT8D72 DIP switch settings**



## NTND01 Integrated CPU and Memory Card

Options	Jumper at J4
Power direct from the backplane	Jumper pins 1 and 2
Power with battery backup from NTND02 (this is factory default setting)	Jumper pins 2 and 3

## NTND02 Misc/SDI/Peripheral Signaling Card

The next four tables list option settings for the NTND02 MSPS Card.

**Table 49**  
**NTND02 port addresses**

Device number		Even port SW8				Odd port SW9					
		1	2	3	4	1	2	3	4	5	6
0	1	*	off	off	off	off	off	off	on	on	on
2	3	*	off	off	off	off	off	off	on	on	off
4	5	*	off	off	off	off	off	off	on	off	on
6	7	*	off	off	off	off	off	off	on	off	off
8	9	*	off	off	off	off	off	off	off	on	on
10	11	*	off	off	off	off	off	off	off	on	off
12	13	*	off	off	off	off	off	off	off	off	on
14	15	*	off	off	off	off	off	off	off	off	off
* Switch does not affect operation; it may be set to ON or OFF.											

**Table 50**  
**NTND02 baud rates—switch settings**

Baud rate	Even port—SW10				Odd port—SW11			
	1	2	3	4	1	2	3	4
150	*	off	on	on	*	off	on	on
300	*	on	off	on	*	on	off	on
600	*	off	off	on	*	off	off	on
1200	*	on	on	off	*	on	on	off
2400	*	off	on	off	*	off	on	off
4800	*	on	off	off	*	on	off	off
9600	*	off	off	off	*	off	off	off
* Switch does not affect operation; it may be set to ON or OFF.								

**Table 51**  
**NTND02 DTE or DCE selection**

Mode	Even port—SW4						Even port—SW5					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	off	off	off	off	off	off	on	on	on	on	on	on
DCE (modem)	on	on	on	on	on	on	off	off	off	off	off	off
NT1P61 (Fibre)	off	off	on	on	on	on	on	on	on	on	off	off
	Odd port—SW2						Odd port—SW3					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE	off	off	off	off	off	off	on	on	on	on	on	on
DCE	on	on	on	on	on	on	off	off	off	off	off	off

**Table 52**  
**NTND02 data format selection**

Format	Even port—SW6				Odd port—SW7			
	1	2	3	4	1	2	3	4
7 bits/character		off	on			off	on	
8 bits/character		off	off			off	off	
Odd parity	on			on	on			on
Even parity	on			off	on			off
No parity	off			*	off			*
* Switch does not affect operation; it may be set to ON or OFF.								

**NTND10 Changeover and Memory Arbitrator Card**

Options	Jumper at J3
1 Mbyte to 12 Mbyte memory	connect pins 1 and 2
768 K memory	connect pins 2 and 3



## QMT8 Add-on Data Module

The next five tables list options settings for the QMT8 ADM.

**Table 53**  
**QMT8 jumper plugs**

Mode	Pin location
ADM connected to DTE (terminal)	Jumpers in U6 and U7
ADM connected to DCE (modem)	Jumpers in U4 and U5

**Table 54**  
**QMT8 SW1 (slide switch)**

SW1 function	SW1 settings
Set the voice frequency DN (VFDN) for modem pooling only*	Set the required 3- or 4-digit VFDN (example: 2406)
ADM is not connected to any modem	Set the switch to 0000
* The VFDN cannot be set unless jumpers U4 and U6 are plugged. The VFDN must be left-justified on the switch (example: if you select 234 as the VFDN, the switch must be set to 2340).	

**Table 55**  
**QMT8 SW2 (rotary dial)**

Transmission mode	Transmission speed
Asynchronous	50 to 19200
Synchronous	1.2 K to 56 K

**Table 56**  
**QMT8 SW3 (DIP switch)**

Transmission mode	Switch settings
Asynchronous	1—inhibit or enable parity 2—even or odd parity 3—HDX or FDX 4—7- or 8-bit code (Note 1) 5—1 or 2 stop bits (Note 2) 6—echo or no echo 7—manual or auto-answer 8—OFF for normal operation, or LOOPBACK test mode (Note 3)
Synchronous	1—not used 2—not used 3—HDX or FDX 4—modem or network (clock) 5—external or internal clock (Note 4) 6—echo or no echo 7—manual or auto-answer 8—OFF for normal operation, or LOOPBACK test mode (Note 3)
<p><b>Note 1:</b> This setting is overridden when switch SW4 positions 5 and 6 are ON. Use 8 bits/character and no parity for all ASCII terminals.</p> <p><b>Note 2:</b> This setting is overridden when switch SW4 position 1 is ON.</p> <p><b>Note 3:</b> See <i>Meridian Data Services operation and tests</i> (553-2731-300) for information on the use of the LOOPBACK setting.</p> <p><b>Note 4:</b> If the synchronous ADM (SADM) is connected to a synchronous terminal (DTE)</p> <ul style="list-style-type: none"><li>— internal clock indicates that the SADM transmits clock to the DTE</li><li>— external clock indicates that the SADM receives clock from the DTE</li></ul> <p>If the synchronous ADM (SADM) is connected to a synchronous modem (DCE)</p> <ul style="list-style-type: none"><li>— internal clock indicates that the SADM receives clock from the DCE</li><li>— external clock indicates that the SADM transmits clock to the DCE</li></ul>	

**Table 57**  
**QMT8 SW4 (DIP switch)**

Configuration option	Switch settings			
	1	2	3	4
Normal 7- or 8-bit operation or keyboard dialing	off	off		
Five-bit code (Note 1)	off	on		
Six-bit code (Note 1)	on	off		
Data hotline	on	on		
Digitone receiver required (Note 2)			off (Note 3)	
Digitone receiver not required (Note 2)			on (Note 3)	
Synchronous (Note 4)				on
Asynchronous (Note 4)				off
<p><b>Note 1:</b> 1.5 stop bits are not supported. These switch positions are not used for synchronous operation.</p> <p><b>Note 2:</b> — If positions 1-3 and the terminal are ON, a carriage return invokes the auto dial operation.  — If positions 1 and 2 are ON with position 3 and the terminal OFF, turning the terminal on invokes hotline.  — If positions 1 and 2 are OFF and position 3 is ON or OFF, a carriage return invokes keyboard dialing. There is no auto-dialing with this mode.  — If position 3 is OFF, a call is terminated if DTR is dropped.</p> <p><b>Note 3:</b> Position 3 permits compatibility with a wide range of modems. Position 3 is OFF if the modem is controlled by level type MI/MIC leads. Position 3 is ON if the modem is controlled by pulse type leads.</p> <p><b>Note 4:</b> Both ASCII and EBCDIC codes are supported in the asynchronous mode. The synchronous mode operation is code independent. Use the reset button when an installed ADM is switched from asynchronous to synchronous mode.</p>				

**QMT11 Asynchronous/Synchronous Interface Module**

Hotline	on*
Forced DTR (data terminal ready)	on**
FDX (full duplex)	on
SYNC	on
INTernal CLK	on
Modem/Network	modem
Auto-Answer	on
Loopback	off
<p>* Only one side of the interface should be set to originate the hotline.  ** Forced DTR automatically reinitiates a dropped hotline call.</p>	

**QPA62 Call Detail Recording 32 K RAM Card**

Card vintage	Switch location	Switch settings							
		1	2	3	4	5	6	7	8
C, E, and G	E1	off	off	on	off	off	off	off	off
	G5	off	off	on	off	off	off	off	off
	F18	off	off	on	off	on	off	on	off
D	F5	off	off	on	off	off	off	off	off
	G5	off	off	off	off	off	off	off	off
F and H	F5	off	off	off	off	off	off	off	off
	G5	off	off	off	on	off	off	off	off

## QPC30 4 K RAM Card

Device number	E5 switch						Device number	E5 switch					
	2	3	4	5	6	7		2	3	4	5	6	7
0	off	off	off	off	off	off	24	off	off	off	on	on	off
1	on	off	off	off	off	off	25	on	off	off	on	on	off
2	off	on	off	off	off	off	26	off	on	off	on	on	off
3	on	on	off	off	off	off	27	on	on	off	on	on	off
4	off	off	on	off	off	off	28	off	off	on	on	on	off
5	on	off	on	off	off	off	29	on	off	on	on	on	off
6	off	on	on	off	off	off	30	off	on	on	on	on	off
7	on	on	on	off	off	off	31	on	on	on	on	on	off
8	off	off	off	on	off	off	32	off	off	off	off	off	on
9	on	off	off	on	off	off	33	on	off	off	off	off	on
10	off	on	off	on	off	off	34	off	on	off	off	off	on
11	on	on	off	on	off	off	35	on	on	off	off	off	on
12	off	off	on	on	off	off	36	off	off	on	off	off	on
13	on	off	on	on	off	off	37	on	off	on	off	off	on
14	off	on	on	on	off	off	38	off	on	on	off	off	on
15	on	on	on	on	off	off	39	on	on	on	off	off	on
16	off	off	off	off	on	off	40	off	off	off	on	off	on
17	on	off	off	off	on	off	41	on	off	off	on	off	on
18	off	on	off	off	on	off	42	off	on	off	on	off	on
19	on	on	off	off	on	off	43	on	on	off	on	off	on
20	off	off	on	off	on	off	44	off	off	on	on	off	on
21	on	off	on	off	on	off	45	on	off	on	on	off	on
22	off	on	on	off	on	off	46	off	on	on	on	off	on
23	on	on	on	off	on	off	47	on	on	on	on	off	on

**Note:** Switch 1 is set to OFF for normal operation and set to ON for card debugging. Switch 8 is set to ON only when the card is used as the spare.

**QPC31 8 K RAM Card**

Device number	E5 switch						Device number	E5 switch					
	2	3	4	5	6	7		2	3	4	5	6	7
0	off	off	off	off	off	off	12	off	off	off	on	on	off
1	off	on	off	off	off	off	13	off	on	off	on	on	off
2	off	off	on	off	off	off	14	off	off	on	on	on	off
3	off	on	on	off	off	off	15	off	on	on	on	on	off
4	off	off	off	on	off	off	16	off	off	off	off	off	on
5	off	on	off	on	off	off	17	off	on	off	off	off	on
6	off	off	on	on	off	off	18	off	off	on	off	off	on
7	off	on	on	on	off	off	19	off	on	on	off	off	on
8	off	off	off	off	on	off	20	off	off	off	on	off	on
9	off	on	off	off	on	off	21	off	on	off	on	off	on
10	off	off	on	off	on	off	22	off	off	on	on	off	on
11	off	on	on	off	on	off	23	off	on	on	on	off	on

**Note:** Switch 1 is set to OFF for normal operation and set to ON for card debugging. Switch 8 is set to ON only when the card is used as the spare.



**QPC33 Tape Interface Card**

Tape unit	E8 switch (address selection)		
	1	2	3
0	off	on	on
1	on	off	on
2	on	on	off
3	off	off	off

**Note 1:** Main system tape units are assigned as tape unit 0. In dual CPU systems, both QPC33 cards are assigned as tape unit 0.

**Note 2:** Use tape unit 1 for Mini-Call Detail Recording (CDR) feature.

**QPC41 Miscellaneous Card**

System type	B5 switch (memory configuration)			
	1	2	3	4
S, MS	on	off	off	on
A with split mode	off	off	on	off
All other systems	off	off	off	on

**QPC43 Peripheral Signaling Card**

Options (minimum vintage N)	Plug location
QSD39, QSD40, QSP31, QSP32 network shelves NT5D21 Core/Network Module NT6D39 CPU/Network Module NT8D35 Network Module NT9D11 Core/Network Module	F13
Other network shelves	F9



**QPC45 Serial Data Interface Card**

Address selection				Speed selection				Output device plug location	
Device number	C15 switch			Baud rate	B15 switch				
	4	5	6		1	2	3		
0	on	on	on	110	on	off	off	TTY	A15
1	off	on	on	300	off	off	off		
2	on	off	on	1200	off	off	on	Modem	B5
3	off	off	on	2400	off	on	off		
4	on	on	off	4800	off	on	on	RS-232 data terminal	B10
5	off	on	off						
6	on	off	off						
7	off	off	off						

**QPC46, QPC155 Common Equipment Bus Extender Cards**

Application	QPC46 A35 switch						QPC155 A35 switch					
	1	2	3	4	5	6	1	2	3	4	5	6
CPU located at extension end of bus	off	off	off	off	off	off	off		off	off	off	off
CPU not located at extension end of bus	off	off	off	off	off	on	on		off	off	off	off
Basic system (QPC155)		on										
Expanded system (QPC155)		off										

**QPC62 1.5 Mbaud Converter Card**

Carrier A & B options* distance to office repeater bay (ORB)		Switch settings** SW1 and SW2								SW3
(Feet)	(Meters)	1	2	3	4	5	6	7	8	
0–150***	0–45	off	off	on	on	off	on	on	off	6 V
151–450	46–147	off	on	on	off	on	on	off	on	12 V
451–750	148–229	on	off	off	on	on	off	on	on	12 V
<p>* If both cards provided are minimum vintage E, insert the plug-in jumper (U-link) between header pins 1 and 2 (located at B25). If any card provided is vintage D, or an earlier vintage, insert the plug-in jumper (U-link) between header pins 2 and 3. On systems equipped with dual network cards, you must use minimum vintage E.</p> <p>** Switch 1 (SW1) is set for carrier A, switch 2 (SW2) is set for carrier B. SW3 refers to the faceplate toggle switch.</p> <p>*** Set to the 0–150 ft range when interfacing directly with the carrier (without going through an ORB).</p>										

**QPC66 2 Mbaud Converter Card**

With vintage C, insert the plug-in jumper (U-link) between header pins 2 and 3. On systems with dual network cards, you must use minimum vintage D; insert the plug-in jumper (U-link) between header pins 1 and 2 (located at B35).

**QPC70, QPC217, QPC293 CO/FX/WATS Trunk Cards**

Application	Unit 0 E35 switch						Unit 1 E5 switch					
	1	2	3	4	5	6	1	2	3	4	5	6
Loop start, 24 V CO battery	off	on	on	on	off	on	off	on	on	on	on	off
Loop start, 48 V CO battery	off	off	on	off	off	on	off	on	off	off	on	off
Ground start, 24 V CO battery	on	on	off	on	off	off	on	off	on	on	off	off
Ground start, 48 V CO battery	on	off	off	off	off	off	on	off	off	off	off	off

## QPC71, QPC287 E&M/DX Signaling and Paging Trunk Cards

Application	Unit 0 E35 switch								Unit 1 E5 switch							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
E&M	off	off	off	on	off	off	on	off	off	off	off	on	off	off	on	off
Paging	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off
DX 2-wire (conductor loop < 2.5 K $\frac{3}{4}$ )	on	on	off	off	off	on	off	on	on	on	off	off	off	on	off	on
DX 2-wire (conductor loop > 2.5 K $\frac{3}{4}$ )	on	on	on	on	off	on	off	on	on	on	on	on	off	on	off	on
DX 4-wire (conductor loop < 2.5 K $\frac{3}{4}$ )	off	off	off	off	on	on	off	on	off	off	off	off	on	on	off	on
DX 4-wire (conductor loop > 2.5 K $\frac{3}{4}$ )	off	off	on	on	on	on	off	on	off	off	on	on	on	on	off	on
<b>Note:</b> DX trunks must be balanced correctly. If the loop is <2.5 K $\frac{3}{4}$ , far-end balancing is standard. If the loop is >2.5 K $\frac{3}{4}$ , far end balancing requires standard plus 2.5 K $\frac{3}{4}$ . To connect PBX to PBX, switches should be arranged for loops to be >2.5 K $\frac{3}{4}$ at one end and <2.5 K $\frac{3}{4}$ at the other. Apply similar treatment when connecting to Pulse QPJ69 trunks.																

## QPC72, QPC288, QPC449, QPC559, QPC560 Loop Signaling Trunk Cards

The next two tables list option settings for loop signaling trunk cards.

**Table 58**

**QPC72, QPC288, QPC449, QPC559, QPC560 single density**

Application	Single density—Unit 0/1 F30/F8* switch					
	1	2	3	4	5	6
Outgoing ANI only:						
loop pulsing	off	off	off	off	off	off
battery and ground pulsing	off	off	off	off	on	off
Other than outgoing ANI	on	off	on	off	on	off
	Jumpers (QPC560) Units 0/1/2/3					
600 ¾ resistive impedance	connect pins 1 and 2					
3-component complex impedance	connect pins 2 and 3					
* On QPC7 vintage 2M (CSA SDT C22.2), the switch location is E27/E11.						

Table 59

QPC72, QPC288, QPC449, QPC559, QPC560 double density

Application	Double density—Unit 0/1/2/3 H17/H3/A17/A3 switch					
	1	2	3	4	5	6
Outgoing ANI only:						
loop pulsing	off	off	off	off	off	off
battery and ground pulsing	off	off	off	off	on	off
Other than outgoing ANI	on	off	on	off	on	off
	Jumpers (QPC560) Units 0/1/2/3					
600 $\frac{3}{4}$ resistive impedance	connect pins 1 and 2					
3-component complex impedance	connect pins 2 and 3					

**QPC73, QPC289 Recorded Telephone Dictation Cards**

Application	Unit 0 D35 switch				Unit 1 D5 switch			
	1	2	3	4	1	2	3	4
External resistance < 430 $\frac{3}{4}$	off	off	off	off	on	off	off	off
External resistance > 430 $\frac{3}{4}$	off	off	off	off	on	off	off	off

**QPC74, QPC290 Recorded Announcement Trunk Cards**

Application	Unit 0—C35 switch				Unit 1—F35 switch			
	1	2	3	4	1	2	3	4
Audichron	off	off	on	off	off	off	on	off
Code-A-Phone	off	on	off	off	off	on	off	off
Cook Digital Announcer (continuous run)	off	off	on	off	off	off	on	off
Cook Digital Announcer (start/stop)	off	on	off	off	off	on	off	off
Test or music (600 $\frac{3}{4}$ source Z)	on	off	off	on	on	off	off	on
	Unit 2—C5 switch				Unit 3—F5 switch			
	1	2	3	4	1	2	3	4
Audichron	off	off	on	off	off	off	on	off
Code-A-Phone	off	on	off	off	off	on	off	off
Cook Digital Announcer (continuous run)	off	off	on	off	off	off	on	off
Cook Digital Announcer (start/stop)	off	on	off	off	off	on	off	off
Test or music (600 $\frac{3}{4}$ source Z)	on	off	off	on	on	off	off	on



**QPC84 Power Monitor**

The next four tables list option settings for the QPC84 Power Monitor.

**Table 60**  
**PC84 vintage R and S—switch A4**

Options	A4 switch							
	1	2	3	4	5	6	7	8
Option A*	on	off	on					
Option B*	off	on	off					
Monitor FAIL and CTR signal**								
— Defeat monitoring (XN/QCA108 cabinet)								on
— Allow monitoring (all other systems)								off
<p>* Options A and B apply to vintage R only. Switch A4 is set based on the cabinet type and vintage suffix. See the following table for option selection.</p> <p>** For vintage S, A4 switch 8 must be ON when CTR signal monitoring is required.</p>								

**Table 61**  
**QPC84 vintage R—options A and B**

Cabinet type	Vintage	Option A	Option B
QCA6	all vintages		X
QCA7	all vintages		X
QCA8	all vintages		X
QCA23	all vintages		X
QCA28	all vintages		X
QCA37	all vintages		X
QCA58	vintages A thru E		X
QCA58*	vintage E1 only	X	
QCA58	vintage F1 and later		X
QCA60	all vintages		X
QCA74	vintages A thru E		X
QCA74*	vintage E1 only	X	
QCA74	vintage F1 and later		X
QCA96	all vintages		X
QCA108**	vintages A thru E		X
QCA108*/**	vintage E1 only	X	
QCA108**	vintage F1 and later		X
QCA109	vintage A and later		X

\* If a vintage A QSP43 or QSP44 converter shelf is equipped, the switch must be set in Option B mode.  
 \*\* C11 switch 1 must be ON for QCA108 cabinets.

**Table 62**  
**QPC84 vintage A to L—switch A5 or D18 (Part 1 of 2)**

Options	A5 or D18* switch							
	1	2	3	4	5	6	7	8
86 V ringing generator fails								
Allow alarm and line transfer	on	off						
Allow alarm but defeat transfer	off	off						
Defeat alarm and transfer	off	on						
48 V regulator fails								
Allow alarm and line transfer			off				on	
Allow alarm but defeat transfer			off				off	
Defeat alarm and line transfer			on				off	
With reserve battery								
Allow trip input				on				
Defeat trip input				off				
±10 V fails (CONV 1)								
Allow line transfer					on			
Defeat line transfer					off			
±10 V fails (CONV 2)								
Allow line transfer						on		
Defeat line transfer						off		
<p>* Switch locations depend on card vintages: for vintages A to K the switch is located at A5; for vintage L the switch is located at D18.</p> <p><b>Note 1:</b> Alarm refers to QPC84 LEDs, cabinet LEDs, remote alarm, and CE alarm (initiate internal diagnostics).</p> <p><b>Note 2:</b> Power, fan, and temperature LEDs are not functional when QPC84 is located in a PE cabinet.</p>								

**Table 62**  
**QPC84 vintage A to L—switch A5 or D18 (Part 2 of 2)**

Options	A5 or D18* switch							
	1	2	3	4	5	6	7	8
Reset button								
Allow reset function								on
Defeat reset function								off
<p>* Switch locations depend on card vintages: for vintages A to K the switch is located at A5; for vintage L the switch is located at D18.</p> <p><b>Note 1:</b> Alarm refers to QPC84 LEDs, cabinet LEDs, remote alarm, and CE alarm (initiate internal diagnostics).</p> <p><b>Note 2:</b> Power, fan, and temperature LEDs are not functional when QPC84 is located in a PE cabinet.</p>								

**Table 63**  
**QPC84 vintage P to S—switches D29 and C11 (Part 1 of 3)**

Options	D29 switch								C11 switch						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
86 V ringing generator fails															
Allow alarm/line transfer	on	off													
Allow alarm, defeat transfer	off	off													
Defeat alarm/line transfer	off	on													
48 V regulator fails															
Allow alarm/line transfer			on				on								
Allow alarm, defeat transfer			on				off								
Defeat alarm/line transfer			off				off								
With reserve battery															
<p><b>Note 1:</b> Alarm refers to QPC84 LEDs, cabinet LEDs, remote alarm, and CE alarm (initiate internal diagnostics).</p> <p><b>Note 2:</b> Power, fan, and temperature LEDs are not functional when QPC84 is located in a PE cabinet.</p> <p><b>Note 3:</b> C11 switch 1 must be ON for QCA108 cabinets.</p>															

**Table 63**  
**QPC84 vintage P to S—switches D29 and C11 (Part 2 of 3)**

Options	D29 switch								C11 switch						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
Allow trip input			on												
Defeat trip input			off												
±10 V fails (QSP43/44 shelf)															
Allow line transfer				on	on						on	on	off	off	
Defeat line transfer				off	off						off	off	off	off	
±10 V fails (CONV 1)															
Allow line transfer				on							off	off	on		
Defeat line transfer				off							off	off	off		
±10 V fails (CONV 2)															
Allow line transfer						on					off	off		on	
Defeat line transfer						off					off	off		off	
Reset button															
Allow reset								on							
Defeat reset								off							
CE power failure															
Allow remote alarm and SYSLTOUT signal									on						
Defeat remote alarm and SYSLTOUT signal									off						
Monitor FAIL/CTR signal															
Defeat monitoring (QCA58, QCA108, QCA109 cabinets)										on					
Allow monitoring (all other cabinets)										off					
<b>Note 1:</b> Alarm refers to QPC84 LEDs, cabinet LEDs, remote alarm, and CE alarm (initiate internal diagnostics). <b>Note 2:</b> Power, fan, and temperature LEDs are not functional when QPC84 is located in a PE cabinet. <b>Note 3:</b> C11 switch 1 must be ON for QCA108 cabinets.															

**Table 63**  
**QPC84 vintage P to S—switches D29 and C11 (Part 3 of 3)**

Options	D29 switch								C11 switch						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
Monitor cooling unit failure															
Defeat monitoring (QCA58 or QCA108 cabinets or QCA109 cabinet with half-group configuration)															on
Allow monitoring (all other configurations)															off
<b>Note 1:</b> Alarm refers to QPC84 LEDs, cabinet LEDs, remote alarm, and CE alarm (initiate internal diagnostics). <b>Note 2:</b> Power, fan, and temperature LEDs are not functional when QPC84 is located in a PE cabinet. <b>Note 3:</b> C11 switch 1 must be ON for QCA108 cabinets.															

## QPC99 Carrier Interface Card

The next two tables list option settings for the QPC99 Carrier Interface Card.

**Table 64**  
**QPC99 A20 switch and F25 pad switch**

Carrier location	Interface equipment	A20 switch						F25 pad switch					
		1	2	3	4	5	6	7	8	9	10	11	12
Local	ORB at local end (pads in)	off	off	off	on	off	on	on	on	on	on	off	off
	Direct to LD-1 or GTE carrier (no ORB at local end) (pads out)	off	off	off	on	on	on	off	off	off	off	on	on
Remote	ORB at remote end (pads in)	on	off	on	off	off	on	on	on	on	on	off	off
	Direct to LD-1 or GTE carrier (no ORB at remote end) (pads out)	on	off	on	off	on	on	off	off	off	off	on	on

**Note:** Consult manufacturer for switch settings if card interfaces with other type of carrier equipment.

**Table 65**  
**QPC99 S2 switch**

Carrier location	Interface equipment	SW2					
		1	2	3	4	5	6
Local	ORB at local end (pads in)	off	off	off	off	on	on
	Direct to LD-1 or GTE carrier (no ORB at local end) (pads out)	on	on	on	on	off	off
Remote	ORB at remote end (pads in)	off	off	off	off	on	on
	Direct to LD-1 or GTE carrier (no ORB at remote end) (pads out)	on	on	on	on	off	off



## QPC139 Serial Data Interface Card

The next two tables list option settings for the QPC139 SDI Card.

**Table 66**  
**QPC139 address and output device selection**

Address selection					Output device		
Device number	F7 switch					Port 1 plug location	Port 2 plug location
	1	2	3	4			
0-1	off	on	on	on	Modem	A13	A25
2-3	off	on	on	off	RS-232 data terminal	A16	A22
4-5	off	on	off	on			
6-7	off	on	off	off			
8-9	off	off	on	on			
10-11	off	off	on	off			
12-13	off	off	off	on			
14-15	off	off	off	off			
<b>Note 1:</b> Switches at D22 and D31 are not used and set to OFF. <b>Note 2:</b> When connecting to NT1P61 Fibre Superloop Network Card, install DIP switches as follows: location A13=off off on on off on on, A16= on on on on on off off, A22=on on on on on off off, A25=off off on on off on on							

**Table 67**  
**QPC139 baud rate selection**

Baud rate	Port 1 C34 switch				Port 2 C22 switch			
	1	2	3	4	1	2	3	4
110	off	on	on	on	off	on	on	on
150	off	off	on	on	off	off	on	on
300	off	on	off	on	off	on	off	on
600	off	off	off	on	off	off	off	on
1200	off	on	on	off	off	on	on	off
2400	off	off	on	off	off	off	on	off
4800	off	on	off	off	off	on	off	off
9600	off	off	off	off	off	off	off	off
<b>Note:</b> Switches at D22 and D31 are not used and set to OFF.								

**QPC173 Power Monitor**

The next two tables list option settings for the QPC173 Power Monitor.

**Table 68****QPC173 vintages A to D**

Options Vintages A to D	A31 switch							
	1	2	3	4	5	6	7	8
Option A*	on	off	on					
Option B*	off	on	off					
Allow reset button function (VL only)**					on			
Defeat reset button function (VLE/XL/XN)**					off			
Allow trip input***						on		
Defeat trip input***						off		
Systems with one QCA25 (QCA14) cabinet or QCA55 cabinet equipped with one group							on	on
Systems with two QCA25 (QCA14) cabinets or QCA55 cabinet equipped with two or three groups							on	off
<p>* Options A and B apply to vintage D only. Switch A31 is set based on the cabinet type and vintage suffix. See the following table for option selection.</p> <p>** Switch 5—Applies to C and later vintages only.</p> <p>*** Switch 6—If trip input is required, must be ON to allow the -48 V cabinet input switches of QCA24 (QCA10), QCA25 (QCA14), QCA8, and QCA55 cabinets to trip when battery voltage is &lt; 43.5 V. If trip input is not required, switch 6 should be OFF.</p> <p>Switch 7—Must be ON for temperature monitoring even in a system with two or three groups.</p> <p>Switch 8—Must be OFF for fan alarm monitoring in a system with more than one group.</p>								

**Table 69**  
**QPC173 vintage D—options A and B**

Cabinet type	Vintage	Option A	Option B
QCA10	all vintages		X
QCA24	all vintages		X
QCA55	vintages A thru E		X
QCA55*	vintage E1 only	X	
QCA55	vintages F1 and later		X

\* If a vintage A QBL21 distribution shelf is equipped, the switch must be set in the Option B mode.

**QPC197 Tone Detector Switch Card**

Options (minimum vintage C)	Jumper plug locations
SL-1 telephone ringing: Audible ringing of 533/666 Hz modulated at 10 Hz—connect pins 1 and 2 20 Hz—connect pins 2 and 3	B5 B5
Dial tone level: Low dial tone level, 23 dB below overflow level connect pins 1 and 2 High dial tone level, 19 dB below overflow level connect pins 2 and 3	B10  B10

**QPC214 Memory Controller Card**

Memory option	QPC214A, B, or C A35 switch								QPC214D A35 switch			
	1	2	3	4	5	6	7	8	1	2	3	4
A standard	off	on	off	off	off	on	off	off	off	off	on	off
A split store	on	off	off	off	off	on	off	off	on	off	on	off
LE standard	off	off	off	off	off	off	off	off	off	off	off	off
LE split store	on	off	off	off	off	off	off	off	on	off	off	off
VLE, XL standard	off	off	off	off	off	off	off	off	off	off	off	off
M standard	—	—	—	—	—	—	—	—	on	on	off	off

**QPC215 Segmented Bus Extender Card**

Network group	D3 Switch					D3 Switches 1, 7, 8, 9, and 10 (for QPC215D vintage)
	2	3	4	5	6	
0	off	on	on	on	on	1= on (Page 3 memory) 1= off (Page 7 memory)
1	off	on	on	on	off	7= on (S/W Enabled XT/71) 7= off (H/W Enabled ST/21)
2	off	on	on	off	on	8= on (CPU/Master) 8= off (Remote/Slave)
3	off	on	on	off	off	9= on (card is in NT8D35) 9= off (card is in all others)
4	off	on	off	on	on	10= unused
To MGC	off	off	off	off	off	

**QPC216 3-Port Extender Card**

Application	A20 switch			
	1	2	3	4
Half network group	on	off		
Full network group	off	off		
Page 3 address			on	
Page 7 address			off	
Multi-group systems				on
Single-group systems				off

**QPC218, QPC272 CO/FX/WATS Trunk Cards**

The next two tables list option settings for the QPC128 and QPC272 trunk cards.

**Table 70**  
**QPC218 (other than vintage F) and QPC272 switch settings**

Application	Unit 0 E35 switch						Unit 1 E5 switch					
	1	2	3	4	5	6	1	2	3	4	5	6
Loop start	off	off	off	off	off	off	off	off	off	off	off	off
Loop start with automatic guard detection	off	off	on	off	off	off	off	off	on	off	off	off
Ground start	on	off	on	off	off	off	on	off	on	off	off	off

**Table 71**  
**QPC218 vintage F**

Application	Unit 0 F27 switch								Unit 1 F9 switch							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Loop start	off	on	off	off	off	off	off	on	off	on	off	off	off	off	off	on
Loop start with automatic guard detection	off	on	on	off	off	off	off	on	off	on	off	off	off	off	off	on
Ground start	off	on	on	off	off	on	off	on	off	on	off	off	off	on	off	on



**QPC219, QPC295 CO/FX/WATS Trunk Cards**

Application	Unit 0 E35 switch								Unit 1 E5 switch							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Loop start:																
Third wire battery on M lead	off	off	off	off	on	off			off	off	off	off	on	off		
Third wire ground on M lead	off	off	off	off	off	on			off	off	off	off	off	on		
Second pair (M & MM)	off	off	off	off	off	off			off	off	off	off	off	off		
Automatic guard detection	off	off	on						off	off	on					
Ground Start:																
Third wire battery on M lead	on	off	on	off	on	off			on	off	on	off	on	off		
Third wire ground on M lead	on	off	on	off	off	on			on	off	on	off	off	on		
Second pair (M & MM)	on	off	on	off	off	off			on	off	on	off	off	off		
900 ¾ termination*							on	on							on	on
600 ¾ termination*							off	off							off	off
* Minimum vintage E. Vintage J has a third switch that must be set as follows:																
1      2      3      4      5      6      7      8																
on    off    off    off    on    off    on    off																

## QPC237A, QPC237B, QPC296A, QPC296B 4-Wire E&M/DX Signaling Trunk Cards

The next three tables show option settings for the trunk cards listed above.

**Table 72**

**QPC237 vintage A, QPC237 vintage B, QPC296 vintage A, QPC296 vintage B**

Unit 0: Unit 1:	S1 (E34) S3 (E4)						S2 (F20) S4 (F7)					
Application	1	2	3	4	5	6	1	2	3	4	5	6
E&M Type I	off	off	on	on	off	off	on	off	on	on	off	on
E&M Type II	off	off	on	off	off	off	on	on	off	off	on	off
DX 4-wire lead A1 to T1, T1 to T2:												
conductor loop < 2.5 K $\frac{3}{4}$	off	on	off	on	on	off	off	off	off	on	off	off
conductor loop > 2.5 K $\frac{3}{4}$	on	on	off	on	on	off	on	off	off	on	off	off
DX 4-wire lead A1 to T2, B1 to T1:												
conductor loop < 2.5 K $\frac{3}{4}$	off	on	off	on	on	off	off	off	off	on	off	off
conductor loop > 2.5 K $\frac{3}{4}$	on	on	off	on	on	off	on	off	off	on	off	off
Unit 0: Unit 1:	S6 (D31) S5 (D3)											
Application	1	2	3	4	5	6						
E&M Type I	off	off	off	off								
E&M Type II	off	off	off	off								
DX 4-wire lead A1 to T1, T1 to T2:												
conductor loop < 2.5 K $\frac{3}{4}$	off	on	off	on								
conductor loop > 2.5 K $\frac{3}{4}$	off	on	off	on								
DX 4-wire lead A1 to T2, B1 to T1:												
conductor loop < 2.5 K $\frac{3}{4}$	on	off	on	off								
conductor loop > 2.5 K $\frac{3}{4}$	on	off	on	off								
Interface:												
carrier interface												
public network												

**Table 73**  
**QPC237 vintage C**

Unit 0: Unit 1:	S1 (D28) S3 (D10)						S2 (D31) S4 (D7)					
Application	1	2	3	4	5	6	1	2	3	4	5	6
E&M Type I	off	off	off	on	off	on	off	off	on	on	off	off
E&M Type II	off	off	off	off	off	on	off	on	off	off	on	off
British Telecom	off	off	off	off	on	on	off	off	on	off	off	off
DX 4-wire lead A1 to T1, B1 to T2		on	on	on	off	off	on	off	on	on	off	off
DX 4-wire lead A1 to T2, B1 to T1		on	on	on	off	off	on	off	on	on	off	off
conductor loop > 2.5 K $\frac{3}{4}$	on											
conductor loop < 2.5 K $\frac{3}{4}$	off											
Unit 0: Unit 1:	S6 (E26) S5 (E12)						S8 (F33) S7 (S4)					
Application	1	2	3	4			1	2	3	4		
E&M Type I	off	off	off	off								
E&M Type II	off	off	off	off								
British Telecom	off	off	off	off								
DX 4-wire lead A1 to T1, B1 to T2	off	on	off	on			on	on				
DX 4-wire lead A1 to T2, B1 to T1	on	off	on	off			on	on				
Interface:												
carrier interface							on		on			
public network								off		off		

**Table 74**  
**QPC237 vintage D, QPC237 vintage E, QPC296 vintage C**

Unit 0: Unit 1:	S1 (D33) S2 (D5)											
Application	1	2	3	4	5	6	7	8	9	10		
E&M Type I	off	off	off	off	off	off	off	off	on	off		
E&M Type II	off	off	off	off	off	off	off	off	on	off		
British Telecom	off	off	off	off	off	off	off	off	on	off		
DX 4-wire lead M to T1, E to T2	off	on	off	on			on	on	off	on		
DX 4-wire lead M to T2, E to T1	on	off	on	off			on	on	off	on		
conductor loop > 2.5 K ¾					on	on						
conductor loop < 2.5 K ¾					off	off						
Unit 0: Unit 1:	S3 (E25) S5 (E13)						S4 (B33) S6 (B5)					
Application	1	2	3	4	5	6	1	2	3	4	5	6
E&M Type I		on		on	on	on	off	off	on	on	off	off
E&M Type II		on		on	on	off	off	on	off	off	on	off
British Telecom		on		on	on	off	on	off	off	on	off	off
DX 4-wire lead M to T1, E to T2		on		on	off	on	off	off	on	on	off	off
DX 4-wire lead M to T2, E to T1		on		on	off	on	off	off	on	on	off	off
Interface:												
carrier interface	on		on									
public network		off		off								

**QPC239 Recorded Telephone Dictation Trunk Card**

Transmission during dialing	Unit 0 D33 switch				Unit 1 D8 switch			
	1	2	3	4	1	2	3	4
Yes	off	off	off	off	off	off	off	off
No	on	off	off	off	on	off	off	off

**QPC327 Multifrequency Sender/Receiver Card**

Options	Jumper plug location
A-Law operation—connect pins 2 and 3	A35
$\mu$ -Law operation—connect pins 1 and 2	A35

**QPC330, QPC331 Buffered Message Register Trunk Cards**

Application	Unit 0 E35 switch						Unit 1 E5 switch					
	1	2	3	4	5	6	1	2	3	4	5	6
Loop start (accumulated pulsing):												
Third wire battery on M lead	off	off	off	off	on	off	off	off	off	off	on	off
Third wire ground on M lead	off	off	off	off	off	on	off	off	off	off	off	on
Second pair (M & MM)	off	off	off	off	off	off	off	off	off	off	off	off
Ground start (accumulating):												
Third wire battery on M lead	on	off	on	off	on	off	on	off	on	off	on	off
Third wire ground on M lead	on	off	on	off	off	on	on	off	on	off	off	on
Second pair (M & MM)	on	off	on	off	off	off	on	off	on	off	off	off
Regular CO trunk (same as QPC219)	off	on	off	on	off	off	off	on	off	on	off	off

**QPC377, QPC379 Conference Cards**

Options	Strap location
Enable warning tone—insert strap from E20 to ENB	D1
Disable warning tone—insert strap from E19 to DIS	D1

**QPC387 Peripheral Buffer Card**

Ringing voltage	A35 switch			
	5	6	7	8
16 Hz, 86 Vrms superimposed on –48 V	on	off	off	off
20 Hz, 86 Vrms superimposed on –48 V	off	on	off	off
25 Hz, 75 Vrms superimposed on –48 V	off	off	on	off
50 Hz, 70 Vrms superimposed on –48 V	off	off	off	on



## QPC390, QPC391 Pulsed E&amp;M Trunk Cards

Table 75

QPC390, QPC391 Pulsed E&amp;M Trunk Cards (Part 1 of 2)

Unit 0: Unit 1:	S1 (D30) S3 (D30)						S2 (D25) S4 (D15)					
	1	2	3	4	5	6	1	2	3	4	5	6
Pulsed E&M Type I:												
North America	off	off	off	on	off	off	off	off	on	on	off	off
Norway	off	off	on	off	on	off	off	off	on	off	off	off
British Post Office	off	off	off	on	off	on	off	off	on	off	off	off
Pulsed E&M Type II:												
North America	off	off	off	off	off	off	off	on	off	off	on	off
Norway	off	off	on	off	off	off	off	on	off	off	on	off
British Post Office	off	off	off	off	off	off	off	on	off	off	on	off
DX 4-wire lead M to T1, lead E to T2:												
Norway		on	on	off	on	off		off	off	off	off	
British Post Office		on	off	off	on	on		off	off	off	off	
DX 4-wire lead M to T2, lead E to T1:												
Norway		on	on	off	on	off		off	off	off	off	
British Post Office		on	off	off	on	on		off	off	off	off	
DX 4-wire:												
conductor loop < 2.5 K $\frac{3}{4}$	off						off					
conductor loop > 2.5 K $\frac{3}{4}$	on						on					
Carrier failure alarm:												
enabled												on
disabled												off

**Note:** Set all positions on S7 (at B37) to OFF.

**Table 75**  
**QPC390, QPC391 Pulsed E&M Trunk Cards (Part 2 of 2)**

Unit 0: Unit 1:	S6 (F35) S5 (F5)					
Application	1	2	3	4	5	6
Pulsed E&M Type I:						
North America	off	off	off	off	off	off
Norway	off	off	off	off	off	off
British Post Office	off	off	off	off	off	off
Pulsed E&M Type II:						
North America	off	off	off	off	off	off
Norway	off	off	off	off	off	off
British Post Office	off	off	off	off	off	off
DX 4-wire lead M to T1, lead E to T2:						
Norway	off	on	off	on	on	on
British Post Office	off	on	off	on	on	on
DX 4-wire lead M to T2, lead E to T1:						
Norway	on	off	on	off	on	on
British Post Office	on	off	on	off	on	on
<b>Note:</b> Set all positions on S7 (at B37) to OFF.						

## QPC414 Network Card

Application	Pin connection J3/S2 and J4/S1
Option A: In-house remote peripheral equipment (RPE), microwave, fiber optics	connect pins 2 and 3 (pin 1 is next to the white dot)
Option B: T-1 facilities (including PRI/DTI),* channel service unit	connect pins 1 and 2 (pin 1 is next to the white dot)
<p>* To connect 1.5M RPE to T-1 through channel service unit, select option B. For 2M RPE, jumper plugs are not used.</p> <p><b>Note 1:</b> Possible jumper locations for vintage B (for different styles/series): J3—E11 or H11 J4—H17 or E7 S1 and S2—E33</p> <p><b>Note 2:</b> Possible jumper locations for vintage A (for different styles/series). These cards do not have the option selection and can only be used in the option A setting: J3—H5 or E11 J4—H17 or E7 S1 and S2—E33</p> <p><b>Note 3:</b> Connectors and loop relations: Even loop: J1 faceplate connector, jumper at J4 or S1 Odd loop: J2 faceplate connector, jumper at J3 or S2</p>	

## QPC417 Junctor Board

All unused connectors must be terminated with QPF36A Junctor Terminating Plugs. Any group not used requires four of these plugs.

**QPC422 Tone Detector Card**

Options	Jumper plug connection
A-Law operation	connect center pin to top pin
$\mu$ -Law operation	connect center pin to lower pin

**QPC423 192 K RAM Card**

Application	Memory page	Range	F11 switch (memory configuration)							
			1	2	3	4	5	6	7	8
Single memory card	0	0–32K	off	on	off	on	off	off	off	on
	1	0–64 K								
	2	32–64 K								
	5	0–64 K								
Dual memory card:										
Module 0	0	0–32 K	on	on	off	off	off	off	off	on
	1	0–64 K								
	2	32–64 K								
Module 1*	5	0–64 K	on	on	off	on	off	off	off	on
	6	0–64 K								
* Module 1 can be either a QPC423 or QPC478 RAM Card.										

## QPC425 CPU Card

The next two tables list option settings for the QPC425 CPU Card.

**Table 76**  
**QPC425 address and output device selection**

SDI address selection										Output device Plug location	
Device number	A1 switch				Device number	A1 switch					
	1	2	3	4		1	2	3	4		
0	on	on	on	on	8	on	on	on	off	Modem	A7
1	off	on	on	on	9	off	on	on	off		
2	on	off	on	on	10	on	off	on	off	Data terminal	A5
3	off	off	on	on	11	off	off	on	off		
4	off	on	off	on	12	off	on	off	off		
5	on	on	off	on	13	on	on	off	off		
6	on	off	off	on	14	on	off	off	off		
7	off	off	off	on	15	off	off	off	off		
<b>Note:</b> Switches 9 and 10 are available on vintage D.											

**Table 77**  
**QPC425 baud rate selection**

Baud rate	A1 switch					
	5	6	7	8	9	10
300	off	off	on	off	on	off
600	off	on	off	on	on	off
1200	on	off	on	on	on	off
1800	off	on	on	on	on	off
2400	off	off	on	off	off	on
4800	off	on	off	on	off	on
9600	on	off	on	on	off	on
<b>Note:</b> Baud rates 2400 and up are available on vintage D.						

## QPC426 192 K RAM Card

Application	Memory page	Range	F11 switch (memory configuration)							
			1	2	3	4	5	6	7	8
N, XN	0	0-64 K	off	off	off	off	off	off	off	on
	1	0-64 K								
	2	0-64 K								
	4	0-64 K	off	off	off	on	off	off	off	on
	5	0-64 K								
	6	0-64 K								
XN	8	0-64 K	off	off	on	off	off	off	off	on
	9	0-64 K								
	10	0-64 K								
	12	0-64 K	off	off	on	on	off	off	off	on
	13	0-64 K								
	14	0-64 K								

## QPC432 4-Port Data Line Card

	Jumper plugs			
	B6	B10	B24	B27
Inside PVC (24 AWG) Outside PIC (22 AWG)	E1-E2	E4-E5	E7-E8	E10-E11
Inside PVC (26 AWG) Outside PIC (24 and 26 AWG)	E2-E3	E5-E6	E8-E9	E11-E12



## QPC441 3-Port Extender Cards

Replace QPC441 vintages as follows: A or B with B1, C with D, E or E1 (series A) with E or E1 (series B), respectively. **For option 51C, 61C and 81C systems, QPC441 vintage F or later must be used in all modules.**

Table 78

**QPC441 3PE Card installed in the NT5D21, NT6D39, NT6D60, and NT9D11 Modules**

<b>Jumper Settings:</b> Set Jumper RN27 at E35 to "A".									
<b>Switch Settings</b>									
<b>Module</b>		<b>D20 switch position</b>							
NT6D39 (Option 51) and NT5D21 and NT9D11 (Option 51C)		1	2	3	4	5	6	7	8
Core/Network		off	on	on	off	on	on	on	on
NT6D39 (Option 61) and NT5D21 and NT9D11 (Option 61C)									
Core/Network 0		off	on	on	off	on	on	on	on
Core/Network 1		off	on	on	off	on	on	on	off
NT6D60 (Option 81)									
Core 0		off	on	on	off	off	on	off	on
Core 1		off	on	on	off	off	on	off	off
NT5D21 (Option 81C)									
Core/Net 0 (Shelf 0)	Group 0	off	on	on	off	on	on	on	on
	Group 1	off	on	on	off	on	on	off	on
	Group 2	off	on	on	off	on	off	on	on
	Group 3	off	on	on	off	on	off	off	on
	Group 4	off	on	on	off	off	on	on	on
Core/Net 1 (Shelf 1)	Group 0	off	on	on	off	on	on	on	off
	Group 1	off	on	on	off	on	on	off	off
	Group 2	off	on	on	off	on	off	on	off
	Group 3	off	on	on	off	on	off	off	off
	Group 4	off	on	on	off	off	on	on	off

Table 79

QPC441 3PE Card installed in modules or shelves *other than* NT5D21, NT6D39, NT6D60, and NT9D11

Jumper Settings									
Set Jumper RN27 at E35 to "A".									
Switch Settings									
D20 switch position:		1	2	3	4				
LE half group		on	off	on	off				
LE full group		off	off	on	off				
RT		on	<i>Note 1</i>	on	off				
N, NT		off	<i>Note 1</i>	on	off				
51, 61		off	<i>Note 1</i>	on	off				
VLE, XL, XN (QCA97)		off	off	on	on				
XN, XT, 71, 81, 81C (Note 2)		off	on	on	on				
Shelf	Group	D20 switch position:				5	6	7	8
0	0					on	on	on	on
	1					on	on	off	on
	2					on	off	on	on
	3					on	off	off	on
	4					off	on	on	on
1	0					on	on	on	off
	1					on	on	off	off
	2					on	off	on	off
	3					on	off	off	off
	4					off	on	on	off
<i>Note 1:</i> If clock controllers are installed, in an N, NT, RT, 51, or 61, switch position 2 must be set to ON; if not, set to OFF.									
<i>Note 2:</i> For option 51C, 61C, and 81C systems, QPC441 vintage F or later must be used in all modules.									

**QPC446, QPC447 Conference Cards**

<b>Options</b>	<b>Action</b>	<b>Strap location</b>
Enable warning tone	Insert strap from E8 to ENB	A37
Disable warning tone	Insert strap from E8 to DIS	A37
Low-tone level (30 dB below digital overload)	Insert strap from E7 to LOW	A37
High-tone level (24 dB below digital overload)	Insert strap from E7 to HIGH	A37

## QPC450, QPC528 CO/FX/WATS Trunk Cards

The following five tables list switch and jumper settings for options available on these trunk cards.

Table 80

### QPC450A, B, and QPC528 Trunk Cards switch and jumper settings

Switch Settings										
Switch position:	Switch S1 (location A23)									
	1	2	3	4	5	6	7	8		
	on	off	on	off	on	off	on	off		
Switch position:	Unit 0, Switch S2 (Location E29) Unit 1, Switch S3 (Location E9) Unit 2, Switch S4 (Location A28) Unit 3, Switch S5 (Location A10)									
	1	2	3	4	5	6	7	8	9	10
Trunk type:										
Loop start	off	on	off	off	on	off			off	off
Ground start	off	on	on	on	on	off			off	off
Metering:										
Second pair (M, MM) or							off	off		
Third wire, battery on M or							off	on		
Third wire, ground on M							on	off		
Jumper Settings										
Jumper:	Unit 0 jumper (Location E27) Unit 1 jumper (Location E11) Unit 2 jumper (Location D29) Unit 3 jumper (Location D9)									
	Unit 0 Jumper	Unit 1 Jumper	Unit 2 Jumper	Unit 3 Jumper						
	600 $\frac{3}{4}$ resistive impedance	Pin 1 to 2	Pin 1 to 2	Pin 1 to 2	Pin 1 to 2					
3-component complex impedance	Pin 2 to 3	Pin 2 to 3	Pin 2 to 3	Pin 2 to 3	Pin 2 to 3					

**Table 81**  
**QPC450C Trunk Card switch settings**

Switch Settings								
	Unit 0, Switch S2 (Location E29) Unit 1, Switch S3 (Location E9) Unit 2, Switch S4 (Location A28) Unit 3, Switch S5 (Location A10)							
Switch position:	1	2	3	4	5	6	7	8
Trunk type:								
Loop start	off	on	off	off	on			off
Ground start	off	on	on	on	on			off
Metering:								
Second pair (M, MM)						off	off	
Third wire, battery on M						off	on	
Third wire, ground on M						on	off	

**Table 82**  
**QPC450C1 and D Trunk Cards switch settings**

Switch Settings								
	Unit 0, Switch S4 (Location F28) Unit 1, Switch S3 (Location F10) Unit 2, Switch S1 (Location C27) Unit 3, Switch S2 (Location B10)							
Switch position:	1	2	3	4	5	6	7	8
Trunk type:								
Loop start	off	on	off			off	off	on
Ground start	off	on	on			on	off	on
Metering:								
Second pair (M, MM) or				off	off			
Third wire, battery on M or				off	on			
Third wire, ground on M				on	off			

**Table 83**  
**QPC450E and F Trunk Cards switch settings**

Switch Settings				
	Unit 0, Switch S4 (Location F25) Unit 1, Switch S3 (Location F11) Unit 2, Switch S1 (Location B25) Unit 3, Switch S2 (Location B13)			
Switch position:	1	2	3	4
Trunk type:				
Loop start	off	off		
Ground start	on	on		
Metering:				
Second pair (M, MM) or			off	off
Third wire, battery on M or			off	on
Third wire, ground on M			on	on

**Table 84**  
**QPC450G Trunk Card switch settings**

Switch Settings						
	Switch S1, Unit 2 (Location B25) Switch S2, Unit 3 (Location B13) Switch S3, Unit 1 (Location F11) Switch S4, Unit 0 (Location F25)					
Switch position:	1	2	3	4	5	6
Trunk type:						
Loop start or	off	off				
Ground start	on	on				
Loop type:						
Short loops (600% compromise impedance network) or					on	off
Long loop (EIA-recommended impedance network)					off	on



**QPC464 Peripheral Buffer Card**

Ringing voltage	D13 or B12 switch					
	1	2	3	4	5	6
16 Hz, 86 Vrms superimposed on -48 V	on	off	off	off		off
20 Hz, 86 Vrms superimposed on -48 V	off	on	off	off		off
25 Hz, 75 Vrms superimposed on -48 V	off	off	on	off		off
50 Hz, 70 Vrms superimposed on -48 V	off	off	off	on		off
Dual density loops					off	
Quad density loops					on	



## QPC471 Clock Controller Card

The next three tables list option settings for the QPC471 Clock Controller Card.

**Table 85**  
**QPC471A**

System	Switch SW2
N, NT, RT, 51, 61	on
XN, XT, 71	off

**Table 86Q**  
**PC471B through G**

Switch or Jumper	MS	ST, STE 21A, 21	N, NT, RT, 51, 61	XN, XT, 71
SW1	on	on	on	off
SW2	on	off	off	off
Jumper F38	TP9-TP10	TP8-TP9	TP8-TP9	TP8-TP9
Jumper G38	TP12-TP13	TP11-TP12	TP11-TP12	TP11-TP12

**Table 87**  
**QPC471 vintage H**

System	SW1				SW2				SW4				
	1	2	3	4	1	2	3	4	1	2	3	4	
ST, STE, 21A, 21, 21E	on	on	on	on	off	off	off	off	off	off	off	off	
MS, S	on	on	on	on	on	on	on	on	off	off	off	off	
RT, N, NT, 51, 51C, 61, 61C	on	on	on	on	off	off	off	off	off	on	*	*	
XN, XT, 71, 81	off	off	off	off	off	off	off	off	off	on	*	*	
81C	on	off	off	off	off	off	off	off	**	on	*	*	
					*Cable length between the J3 faceplate connectors:								
					0–4.3 m (0–14 ft)							off	off
					4.6–6.1 m (15–20 ft)							off	on
					6.4–10.1 m (21–33 ft)							on	off
					10.4–15.2 m (34–50 ft)							on	on
* If there is only one clock controller card in the system, set to OFF. If there are two clock controller cards, determine the total cable length between the J3 connectors (no single cable can exceed 25 ft.) and set these two switch positions for this cable length, as shown above. Set the switches on both cards to the same settings.													
** Set to ON for clock controller 0. Set to OFF for clock controller 1.													

**QPC472 Digital Trunk Interface Card**

Switch setting (transmission equalization)	Distance to repeated facility	Distance to cross-connect point
5 on	0–45 m (0–150 ft)	0–15 m (0–55 ft)
2, 4, 6 on	45–135 m (150–450 ft)	15–100 m (56–355 ft)
1, 3, 7 on	135–225 m (450–750 ft)	100–200 m (355–655 ft)
<b>Note:</b> Set all switch position to OFF except those shown in the “switch setting” column.		

**QPC478 128 K RAM Card**

System type	Memory page	Range	F11 switch (memory configuration)							
			1	2	3	4	5	6	7	8
M, MS, S    Module 0	0	0–32 K	on	on	off	off	off	off	off	on
	1	0–64 K								
	2	32–64 K								
M, MS, S    Module 1	5	0–64 K	on	on	off	on	off	off	off	on
	6	0–64 K								
<b>Note:</b> Module 1 can be either a QPC478 RAM or a QPC423 RAM.										

**QPC479 128 K RAM Card**

System type	Memory page	Range	F11 switch (memory configuration)							
			1	2	3	4	5	6	7	8
LE, N	0	0–64 K	on	off	off	off	off	off	off	on
	1	0–64 K								
LE, N	5	0–64 K	on	off	on	off	off	off	off	on
	6	0–64 K								
LE, N	2	0–64 K	on	off	on	on	off	off	off	on
	6	0–64 K								
LE, N	0	0–32 K	on	off	off	on	off	off	off	on
	1	0–32 K								
	2	0–64 K								

**QPC503 Common Equipment Backplane**

Application	Pin connections		
	P1	P5	P6
Main CE shelf without remote CE shelf	1-8 3-6	1-8 3-6	1-8 4-5
Main CE shelf with remote CE shelf	1-8 4-5	2-7 4-5	1-8 4-5
Remote CE shelf	1-8 3-6	2-7 4-5	1-8 4-5
<b>Note 1:</b> The option plugs P1, P5, and P6 are 8-pin sockets. To set the required option, connect the pins indicated with the metal straps provided.			
<b>Note 2:</b> Option plugs P2, P3, and P4 are set during manufacture and should not be changed.			

**QPC513 Enhanced Serial Data Interface Card**

Program socket selection				Switch S2—Address selection								
Option	Port	Socket number		Device number	Style A				Style B			
					1	2	3	4	1	2	3	4
DTE (terminal)	1	UA10	UA12	0–1	off	off	off	*	off	off	off	*
	2	UA17	UA19	2–3	on	off	off	*	off	off	on	*
DCE (modem)	1	UA9	UA11	4–5	off	on	off	*	off	on	off	*
	2	UA16	UA18	6–7	on	on	off	*	off	on	on	*
RS-232-C interface	1	UB9	UB11	8–9	off	off	on	*	on	off	off	*
	2	UB16	UB18	10–11	on	off	on	*	on	off	on	*
High-speed interface	1	UB10	UB12	12–13	off	on	on	*	on	on	off	*
	2	UB17	UB19	14–15	on	on	on	*	on	on	on	*

\* ON = synchronous mode; OFF = asynchronous mode. (Asynchronous mode is not supported. However, in releases prior to X11 release 18, asynchronous mode may work in some applications. With Release 18 and later, asynchronous mode will not work.)

**QPC525, QPC526, QPC527 CO Trunk Card**

Application	Switches at E29/E9/A29/A11 Units 0/1/2/3							
	1	2	3	4	5	6	7	8
0 ¼ outpulsing	on	off						off
Standard outpulsing	off	on						off
Ground start			on	on				off
Loop start			off	off				off
Loop start, automatic guard detection			off	on				off
QPC524 not installed					on			off
QPC524 installed					off			off
Battery on M operation						off	on	off
Ground on M operation						on	off	off
Second pair M&MM						off	off	off

**QPC550 Direct Inward Dial Trunk Card**

The next five tables give the option settings for the QPC550 DID Trunk Card.

**Table 88**

**QPC550 vintages A and B—real/complex balance impedance selection**

Device location	Device designation	Switch number	Unit number	Impedance type	
				Real	Complex
F31	S4.0	1	0	on	off
F24	S4.1	1	1	on	off
F16	S4.2	1	2	on	off
F11	S4.3	1	3	on	off



**Table 89**  
**QPC550 vintage A—600/900 Ohm impedance selection**

Device location	Device designation	Unit number	Impedance (ohms)	Switch number							
				1	2	3	4	5	6	7	8
G29(a)	S3.0	0	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on
G29(b)	S3.1	1	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on
G8(a)	S3.2	2	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on
G8(b)	S3.3	3	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on

**Table 90**  
**QPC550 vintage A—software/hardware control for 2dB pad**

Device location	Device designation	Unit number	Switch number	S/W	2 dB pad control H/W	
					(pad in)	(pad out)
F38	S1	0	1	off	off	on
			2	on	off	off
		1	3	on	off	off
			4	off	off	on
F1	S2	0	1	off	off	on
			2	on	off	off
		1	3	on	off	off
			4	off	off	on

Table 91

QPC550 vintage B—attenuation level control

Device location	Device designation	Unit number	Switch number								2 dB option
			1	2	3	4	5	6	7	8	
D39	S2.0/1	0	on		on		on		on		on
		1		off		off		off		off	off
D1	S2.2/3	2	on		on		on		on		on
		3		off		off		off		off	off

Table 92

QPC550 vintage B—software control for 2dB pad

Device location	Device designation	Unit number	Switch number	2 dB pad control H/W	
				(pad in)	(pad out)
F38	S1.0/1	1	1	on	off
			2	off	off
		0	3	off	off
			4	on	off
F1	S1.2/3	3	1	on	off
			2	off	off
		2	3	off	off
			4	on	off

## QPC551 Radio Paging Trunk Card

Signal duration on the 18-pair faceplate				S1 (F33)								
				1	2	3	4	5	6			
Binary value (.1 second)				1	2	4	8	16	32			
<b>Note:</b> This switch determines the length of time a signal stays on the 18-pair data bus. The time is set in binary to the nearest tenth second. For example, to keep data on the bus for 5 seconds, the switch settings total 50 by closing S1.2, S1.5, and S1.6.												
Signal duration and pause time				S2 (G33)								
				1	2	3	4	5	6	7		
Binary value (.1 second)				1	2	4	8	16	32	64		
<b>Note:</b> This switch determines the time data must stay on the 18-pair data bus plus the pause time between the removal of data and the reappearance of subsequent data. The time is set in binary to the nearest tenth second. For example, to keep data on the bus for 5 seconds and have a pause time of 3.2 seconds, the switch settings should total 82 by closing S2.2, S2.5, and S2.7.												
Application			S3 (E2) S4 (F2) Unit 0, Unit 1									
	1	2	Address	3	4	5	6	Address	3	4	5	6
Paging			0	off	off	off	off	8	off	off	off	on
single	on		1	on	off	off	off	9	on	off	off	on
multiple	off		2	off	on	off	off	10	off	on	off	on
			3	on	on	off	off	11	on	on	off	on
Timer*			4	on	off	on	off	12	on	off	on	on
enabled		on	5	on	on	on	off	13	on	off	on	on
disabled		off	6	off	on	on	off	14	off	on	on	on
			7	on	on	on	off	15	on	on	on	on
* When enabled, this switch prevents a signal from being sent from a paging unit until 5 seconds have elapsed since the beginning of the previous signal on that same unit.												
S5 (E38) Unit 0			S6 (D1) Unit 1									
Impedance termination			1									
Real			on									
Complex			off									

**QPC574, QPC595 Digitone Receiver Cards**

	Location	Connection
12 DTMF tones	E9	Center to E3
16 DTMF tones	E9	Center to E2

**QPC577, QPC596 Digitone Receiver Daughterboards**

16/12 tone options jumper	Jumper at P1
16 tone (4 x 4)	connect pins 1 and 2
12 tone (3 x 4)	connect pins 2 and 3
<b>Note:</b> When a DTR daughterboard is installed, check YES on the faceplate of the QPC659 Dual Loop Peripheral Buffer.	

**QPC584 Mass Storage Interface Card**

Options	SwitchS3							
	1	2	3	4	5	6	7	8
5.25-inch disk drives only	on	off	off	off	off	off	off	off
5.25-inch disk drives and 5.25-inch hard drive	on	off	off	on	off	off*	off	off
3.5-inch disk drives only	on	off	off	off	on	off	**	off
3.5-inch disk drives and 3.5-inch hard drive	on	off	off	on	on	off	**	off
<b>Note:</b> Minimum vintage E is required for 3.5 inch drives. Minimum vintage L is required for X11 release 18.								
* When a QMM38 MSU is replaced, set switch 6 to ON before the faulty QMM38 is powered down so the disk head will retract (shipping mode). After the replacement MSU is installed, set switch 6 to OFF.								
** For 4 Mbyte set to ON. For 2 Mbyte set to OFF.								

## QPC650, QPC651 Music Trunk Cards

Channel	Switch location	Switch settings*			
		1	2	3	4
0	F31	x		x	
1	F31		x		x
2	F9	x		x	
3	F9		x		x
4	C31	x		x	
5	C31		x		x
6	C9	x		x	
7	C9		x		x
* Set x to OFF if the impedance of the announcement source is 2 or 4 $\frac{3}{4}$ . Set x to ON if the impedance of the announcement source is 600 $\frac{3}{4}$ .					

**QPC659 Dual Loop Peripheral Buffer Card**

Options	Switch settings								
	U25				U3	U9	U10	U14	U22
	1	2	3	4	(all)	(all)	(all)	(all)	(all)
± 10 V monitor disables circuit enables circuit	off on								
Ringing select 20 Hz and 25 Hz 50 Hz		off on							
Quad double density quad density			off on						
Loop dual single				on off	off on	off on	off on	on off	off on

**QPC672 512 K Memory Card**

System type	Memory page	Range	F11 switch (memory configuration)							
			1	2	3	4	5	6	7	8
N, XN, LE, VLE, XL, N(QCA96) and XN(QCA97)	0	0–64 K	off	off	on	off	off	off	off	on
	1	0–64 K								
	2	8–64 K								
	4	0–64 K								
	5	0–64 K								
	6	0–64 K								
	8	0–64 K								
	9	0–64 K								
<b>Note:</b> Switch 8 must be OFF for non-CE shelf.										

**QPC673 512 K Memory Card**

System type	Memory page	Range	F11 switch (memory configuration)							
			1	2	3	4	5	6	7	8
MS, S, ST	0	0–64 K	off	off	on	off	off	off	off	on
	1	0–64 K								
	2	8–64 K								
	4	0–64 K								
	5	0–64 K								
	6	0–64 K								
	8	0–64 K								
	9	0–64 K								
<b>Note:</b> Switch 8 must be OFF for non-CE shelf.										



**QPC674 256 K Memory Card**

System type	Memory page	Range	F11 switch (memory configuration)							
			1	2	3	4	5	6	7	8
MS, S	0	0–32 K	off	off	off	off	off	off	off	on
	1	0–64 K								
	2	32–64 K								
	5	0–64 K								
	6	0–64 K								
<b>Note 1:</b> This card responds to both module 0 and module 1 in existing software.										
<b>Note 2:</b> No software change is required if configuration for two 128 K modules was used.										

**QPC687 CPU Card**

Address selection B1 switch					Speed selection B1 switch*							Output device		
Device number	1	2	3	4	Baud rate	5	6	7	8	9	10			
0	on	on	on	on	300	off	off	on	off	on	off	QPC687A Port	Plug location	
1	off	on	on	on	600	off	on	off	on	on	off			
2	on	off	on	on	1200	on	off	on	on	on	off	Modem	A7	
3	off	off	on	on	1800	off	on	on	on	on	off		A5	
4	on	on	off	on	2400	off	off	on	off	off	on	EIA data terminal		
5	off	on	off	on	4800	off	on	off	on	off	on			
6	on	off	off	on	9600	on	off	on	on	off	on	QPC687B Port	Switch location	
7	off	off	off	on									A23	B23
8	on	on	on	off								Modem	S1	S2
9	off	on	on	off									All on	All off
10	on	off	on	off								EIA data terminal	All off	All on
11	off	off	on	off										
12	on	on	off	off										
13	off	on	off	off										
14	on	off	off	off										
15	off	off	off	off										

\* On vintage B, the option plug has been replaced with two switches (S1 and S2) in locations A23 and B23.

**QPC699 Common Equipment Backplane**

Application	Pin connections		
	P1	P5	P6
Network slot	1–8 3–6	1–8 3–6	1–8 4–5
Segmented bus extender—main shelf	1–8 4–5	2–7 4–5	1–8 4–5
Segmented bus extender—remote shelf	1–8 3–6 4–5	2–7 4–5	1–8
<b>Note 1:</b> The option plugs P1, P5, and P6 are 8-pin sockets. To set the required option, connect the pins indicated with the metal straps provided.			
<b>Note 2:</b> Option plugs P2, P3, and P4 are set during manufacture and should not be changed.			

## QPC720 Primary Rate Interface Card

Switch S2 settings	To repeatered facility	To cross-connect point
5 on	0–45 m (0–150 ft)	0–30 m (0–100 ft)
2, 4, 6 on	46–135 m (151–450 ft)	31–100 m (101–355 ft)
1, 3, 7 on	136–225 m (451–750 ft)	101–200 m (356–655 ft)
<b>Switch 3 option for DTI with ESF</b>  SW3-1    on    = extended superframe format (ESF) off    = superframe format (SF)		
<b>Note 1:</b> All positions on S2 (location B22) are OFF except as shown under the column labeled "Switch S2 settings."		
<b>Note 2:</b> The switch 3 option for DTI with ESF applies to only X11 releases 16, 17, and 18. All other positions on the 8-pole SW3 (location E37) should be OFF.		
<b>Note 3:</b> Before X11 release 19 (releases 16, 17, and 18), you must set the framing format as ESF with the DLOP prompt in LD17 before you set SW3-1 on the card for the DTI with ESF option.		
<b>Note 4:</b> Beginning with X11 release 19, framing format, line encoding, and method of yellow alarm are selectable for both DTI and PRI in LD17 with the DLOP, LCMT, and YALM prompts. All SW3 switch positions should be OFF.		
<b>Note 5:</b> QPC720E is a standard product since July, 1993 backwards compatible to X11 release 13 software.		

**QPC742 Floppy Disk Interface Card**

Options	SW3							
	1	2	3	4	5	6	7	8
5.25-inch disk drives	on	off	off	off	off	off	off	off
3.5-inch disk drives	on	off	off	off	on	off	*	**
<p><b>Note:</b> Minimum vintage D is required for 3.5 inch drives. Minimum vintage F is required for X11 release 18.</p> <p>* For 4 Mbyte set to ON. For 2 Mbyte set to OFF.</p> <p>** For STE or 21E, set to ON when the NTND01 Integrated CPU/Memory (ICM) Card is installed. For all other systems, set to OFF.</p>								

**QPC757 D-Channel Interface Card**

Vintage A socket selection				Address selection				
Option	Port	Socket number		Device number	S2 switch			
					1	2	3	4
Data terminal equipment (DTE)	0	UA10	UA12	0–1	off	off	off	off
	1	UA17	UA19	2–3	off	off	on	off
Data communication equipment (DCE)	0	UA9	UA11	4–5	off	on	off	off
	1	UA16	UA18	6–7	off	on	on	off
RS-232-C interface	0	UB9	UB11	8–9	on	off	off	off
	1	UB16	UB18	10–11	on	off	on	off
High-speed interface	0	UB10	UB12	12–13	on	on	off	off
	1	UB17	UB19	14–15	on	on	on	off
Vintage C socket selection				Address selection				
DTE	0	U11	U9	0–1	off	off	off	off
	1	U5	U3	2–3	off	off	on	off
DCE	0	U12	U10	4–5	off	on	off	off
	1	U6	U4	6–7	off	on	on	off
RS-232-C interface	0	U31	U29	8–9	on	off	off	off
	1	U25	U23	10–11	on	off	on	off
High-speed interface	0	U30	U28	12–13	on	on	off	off
	1	U24	U22	14–15	on	on	on	on

QPC757 vintage G is a standard product starting 11/93 and it is backwards compatible with X11 release 14 and higher software. It has the same socket and address selection as vintage C.

## QPC775 Clock Controller Card

The next two tables give option settings for the QPC775 Clock Controller card.

**Table 93**  
**QPC775 (before vintage E) switch settings**

	SW2				SW3				SW4			
	1	2	3	4	1	2	3	4	1	2	3	4
XN, XT, 71, 81, 81C	off	off	off	off	off	off	off	off	on	on	on	on
N, NT, RT, ST, STE, 21A, 21, 21E, 51, 51C, 61, 61C	on	on	on	on	off	off	off	off	on	on	on	on
MS, SN	on	on	on	on	on	on	on	on	off	off	off	off

**Table 94**  
**QPC775 vintage E switch settings**

System	SW1				SW2				SW4				
	1	2	3	4	1	2	3	4	1	2	3	4	
ST, STE, 21A, 21, 21E	on	on	on	on	off	off	off	off	off	off	off	off	
MS	on	on	on	on	on	on	on	on	off	off	off	off	
RT, N, NT, 51, 51C, 61, 61C	on	on	on	on	off	off	off	off	off	on	*	*	
XN, XT, 71, 81	off	off	off	off	off	off	off	off	off	on	*	*	
81C	on	off	off	off	off	off	off	off	**	on	*	*	
					*Cable length between the J3 faceplate connectors:								
					0–4.3 m (0–14 ft)							off	off
					4.6–6.1 m (15–20 ft)							off	on
					6.4–10.1 m (21–33 ft)							on	off
					10.4–15.2 m (34–50 ft)							on	on
* If there is only one clock controller card in the system, set to OFF. If there are two clock controller cards, determine the total cable length between the J3 connectors (no single cable can exceed 25 ft.) and set these two switch positions for this cable length, as shown above. Match the settings on the two cards.													
** Set to ON for clock controller 0. Set to OFF for clock controller 1.													



## QPC841 4-Port Serial Data Interface Card

The next four tables list option settings for the QPC841 4-Port SDI Card.

**Table 95**  
**QPC841 port 1 and 2 address selection**

Device number		SW14							
Port 1	Port 2	1	2	3	4	5	6	7	8
0	1	off	off	off	off	off	on	on	on
2	3	off	off	off	off	off	on	on	off
4	5	off	off	off	off	off	on	off	on
6	7	off	off	off	off	off	on	off	off
8	9	off	off	off	off	off	off	on	on
10	11	off	off	off	off	off	off	on	off
12	13	off	off	off	off	off	off	off	on
14	15	off	off	off	off	off	off	off	off

**Note 1:** On SW16, positions 1, 2, 3, and 4 must be OFF.

**Note 2:** To avoid address conflicts, SW14 and SW15 can never have identical setting.

**Note 3:** To disable ports 1 and 2, set SW14 position 1 to ON.

**Table 96**  
**QPC841 port 3 and 4 address selection**

Device number		SW15							
Port 3	Port 4	1	2	3	4	5	6	7	8
0	1	off	off	off	off	off	on	on	on
2	3	off	off	off	off	off	on	on	off
4	5	off	off	off	off	off	on	off	on
6	7	off	off	off	off	off	on	off	off
8	9	off	off	off	off	off	off	on	on
10	11	off	off	off	off	off	off	on	off
12	13	off	off	off	off	off	off	off	on
14	15	off	off	off	off	off	off	off	off

**Note 1:** On SW16, positions 1, 2, 3, and 4 must be OFF.

**Note 2:** To avoid address conflicts, SW14 and SW15 can never have identical setting.

**Note 3:** To disable ports 3 and 4, set SW15 position 1 to ON.

**Table 97**  
**QPC841 baud rate**

Baud rate	Port 1 SW10				Port 2 SW11				Port 3 SW12				Port 4 SW13			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
150	off	off	on	on	off	off	on	on	off	off	on	on	off	off	on	on
300	off	on	off	on	off	on	off	on	off	on	off	on	off	on	off	on
600	off	off	off	on	off	off	off	on	off	off	off	on	off	off	off	on
1200	off	on	on	off	off	on	on	off	off	on	on	off	off	on	on	off
2400	off	off	on	off	off	off	on	off	off	off	on	off	off	off	on	off
4800	off	on	off	off	off	on	off	off	off	on	off	off	off	on	off	off
9600	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off

**Table 98**  
**QPC841 DTE or DCE selection**

Mode	Port 1—SW8						Port 1—SW9					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	on	on	on	off	off	off	off	off	off
DCE (modem)	off	off	off	off	off	off	on	on	on	on	on	on
NT1P61 (Fibre)	on	off	off	on	off	off	on	off	off	off	on	on
DTE DCE NT1P61 (Fibre)	Port 2—SW6						Port 2—SW7					
	on	on	on	on	on	on	off	off	off	off	off	off
	off	off	off	off	off	off	on	on	on	on	on	on
	on	off	off	on	off	off	on	off	off	off	on	on
DTE DCE	Port 3—SW4						Port 3—SW5					
	on	on	on	on	on	on	off	off	off	off	off	off
	off	off	off	off	off	off	on	on	on	on	on	on
DTE DCE	Port 4—SW2						Port 4—SW3					
	on	on	on	on	on	on	off	off	off	off	off	off
	off	off	off	off	off	off	on	on	on	on	on	on

## Sample settings for NT8D22 System Monitors

This chapter gives examples of system monitor option settings for basic system configurations. (See Tables 99 to 108.) These configurations are only samples; you may have a variety of complex configurations. See “NT8D22 System Monitor” on page 73 for detailed information.

### Meridian 1 systems

The master system monitor must be configured in the CPU column. In options 71 and 81, the master must be configured in the column containing CPU 0, and slave unit 1 must be configured in the column containing CPU 1. Any other system monitors are slaves.

**Table 99**  
**Master system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	off	off	*	on**	off	off	off	off
SW2	on	off	(For switches 3 to 8, see “NT8D22 settings for total number of slaves—SW2 on master” in option settings.)					
SW3	on	on	on	on				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** PFTU enabled because of over-temperature in column with master system monitor.								

**Table 100**  
**Slave system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	off	off	*	**	off	off	off	off
SW2	off	off	(For 3–8, see “NT8D22 slave address—SW2 on slave” in option settings)					
SW3	off	off	off	off				
<p>* Set to ON for DC-powered systems, OFF for AC-powered systems.</p> <p>** Set to ON to enable PFTU during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.</p>								

## ST, STE, and RT systems with Meridian 1 upgrades

The following tables give examples of option settings for the following:

- ST, STE, or RT with peripheral equipment (PE) upgrade
- ST, STE, or RT with common equipment (CE) upgrade

### ST, STE, or RT with PE upgrade

Configure the system monitor in one PE column as the master. Configure any other system monitors as slaves. If there are CE *and* PE modules, use the option settings for CE upgrades.

**Table 101**  
**Master system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	off	*	**	on	on	on	on
SW2	on	on	(For switches 3 to 8, see "NT8D22 settings for total number of slaves—SW2 on master" in option settings)					
SW3	on	on	on	on				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** Set to ON to enable PFTU during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.								

**Table 102**  
**Slave system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	off	*	**	on	on	on	on
SW2	off	on	(For switches 3 to 8, see "NT8D22 slave address—SW2 on slave" in option settings)					
SW3	off	off	off	off				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** Set to ON to enable PFTU during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.								



## ST, STE, RT with CE upgrade

Configure the system monitor in the CPU column as the master. Configure any other system monitors as slaves.

**Table 103**  
**Master system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	on	*	on**	on	on	off	on
SW2	on	on	(For switches 3 to 8, see "NT8D22 settings for total number of slaves—SW2 on master" in option settings)					
SW3	on	on	on	on				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** PFTU enabled because of over-temperature in column with master system monitor.								

**Table 104**  
**Slave system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	off	*	**	on	on	off	on
SW2	off	on	(For switches 3 to 8, see "NT8D22 slave address—SW2 on slave" in option settings)					
SW3	off	off	off	off				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** Set to ON to enable PFTU during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.								

## NT and XT systems with Meridian 1 upgrades

The following tables give examples of option settings for

- NT or XT with PE upgrade
- NT or XT with CE upgrade

### NT or XT with PE upgrade

Configure the system monitor in one PE column as the master. Configure any other system monitors as slaves. If there are CE *and* PE modules, use the option settings for CE upgrades.

**Table 105**  
**Master system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	off	*	**	off	off	on	off
SW2	on	off	(For switches 3 to 8, see "NT8D22 settings for total number of slaves—SW2 on master" in option settings)					
SW3	on	on	on	on				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** Set to ON to enable PFTU during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.								

**Table 106**  
**Slave system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	off	*	**	off	off	on	off
SW2	off	off	(For switches 3 to 8, see "NT8D22 slave address—SW2 on slave" in option settings)					
SW3	off	off	off	off				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** Set to ON to enable PFTU during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.								

## NT or XT with CE upgrade

Configure the master system monitor in the column containing CPU 0.  
 Configure the system monitor in the column containing CPU 1 as slave unit 1.  
 Configure any other system monitors as slaves.

**Table 107**  
**Master system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	on	*	on**	off	off	off	on
SW2	on	off	(For switches 3 to 8, see "NT8D22 settings for total number of slaves—SW2 on master" in option settings)					
SW3	on	on	on	on				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** PFTU enabled because of over-temperature in column with master system monitor.								

**Table 108**  
**Slave system monitor switch settings**

Switch	1	2	3	4	5	6	7	8
SW1	on	off	*	**	off	off	off	on
SW2	off	off	(For switches 3 to 8, see "NT8D22 slave address—SW2 on slave" in option settings)					
SW3	off	off	off	off				
* Set to ON for DC-powered systems, OFF for AC-powered systems. ** Set to ON to enable PFTU during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.								

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Meridian 1

## **Circuit card installation and testing**

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Meridian 1

# Telephone and attendant console installation

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Telephone and attendant console installation



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## About this document

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This document contains the installation procedures for attendant consoles, telephones, and add-on modules. See Figure 1 for apparatus designations.

“Wiring installation” on page 3 includes information about the wiring for all telephones and attendant consoles.

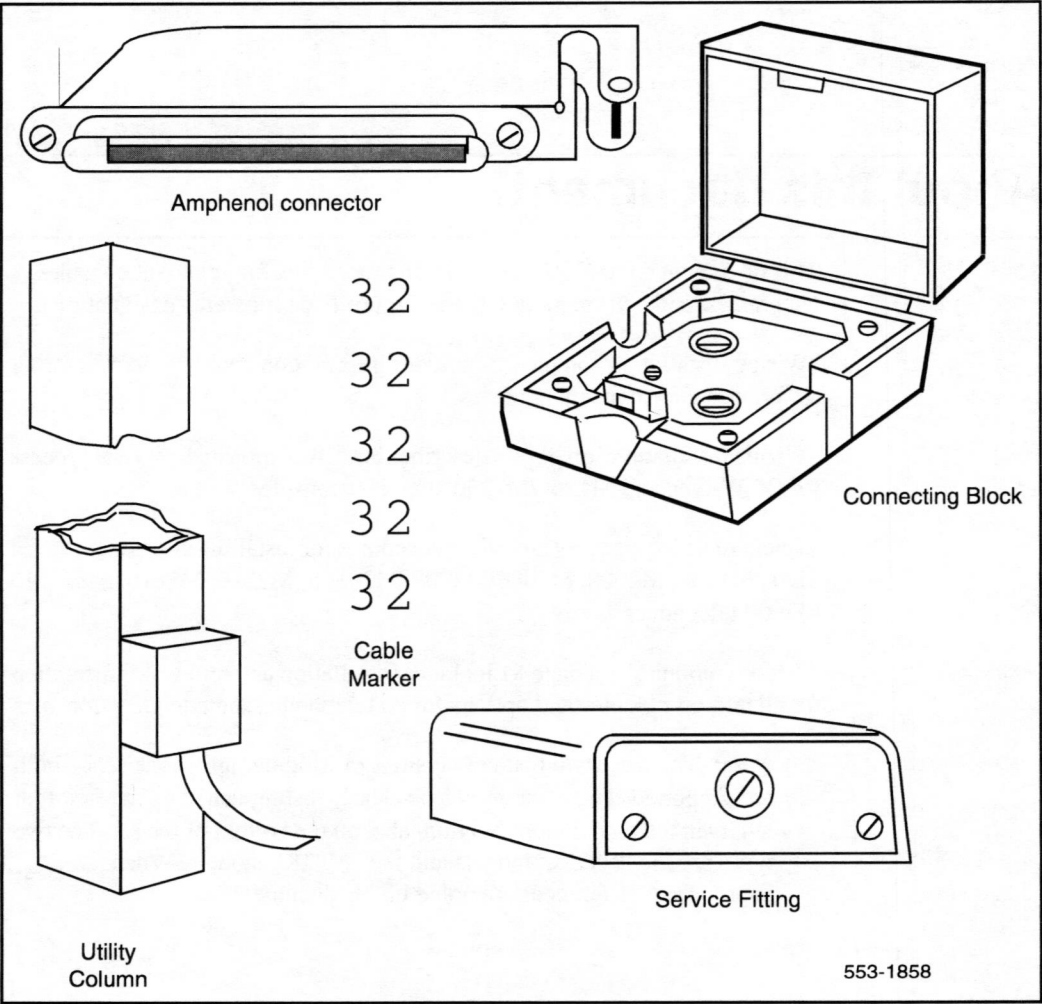
“Wiring installation” on page 3 describes the installation and removal process for QCW-type and M1250/M2250 attendant consoles.

“Telephones” on page 39 provides procedures for installing and removing the SL-1, M1109, M2000, M2006/M2008, M2016S, M2216, M2616, and M3000 telephones.

“Add-on modules” on page 81 includes installation and removal information for all add-on modules and options for all telephones and attendant consoles.

**Note:** There are two distinct versions of Modular telephone sets—both are supported. The versions can be clearly distinguished by the first four letters in the model identification label on the bottom of the set. The two types are the “NTZK” models and the “NT2K” models. When appropriate, differences are noted in this document.

Figure 1  
Apparatus designations



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# Wiring installation

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## Wiring for telephones and attendant consoles

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This chapter discusses the installation and removal procedures for wiring for telephones and attendant consoles.

Each 500/2500-type telephone requires one pair of Z station wire or equivalent. Each SL-1 telephone requires two pairs of Z station wire or equivalent. You can use existing 16- or 25-pair connectorized cable. Each attendant console requires a 16-pair cable terminated on an Amphenol connector.

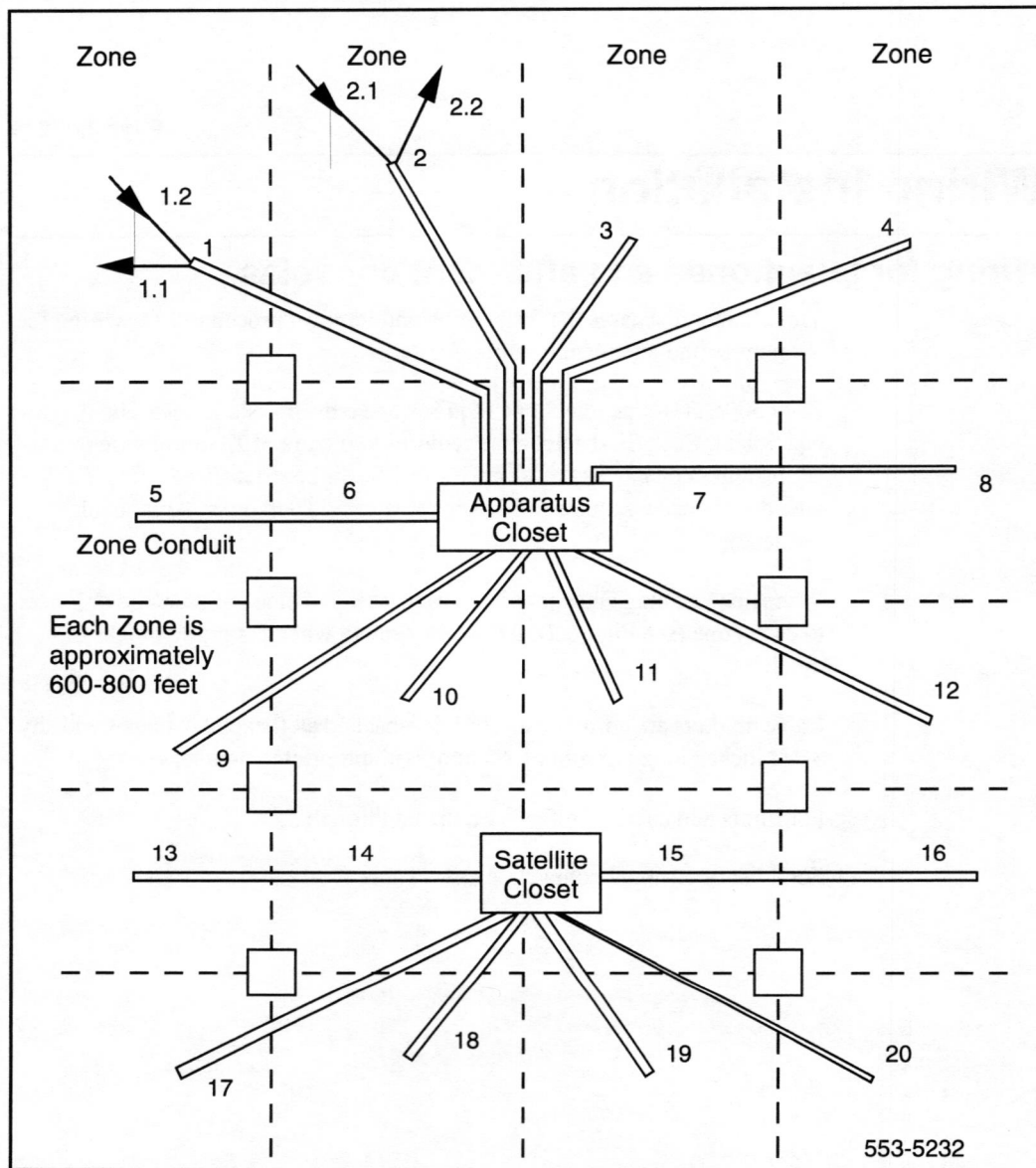
When zone cabling and conduit are used, assign a block of numbers or letters to each zone (see Figure 2). Allow for growth when assigning blocks of numbers.

Cable markers are normally an adhesive-backed cloth tape 1/2 inches wide by 3-1/2 inches long (15 mm by 65 mm) with preprinted numbers.

For limits and cabling, refer to Figures 3 through 5.

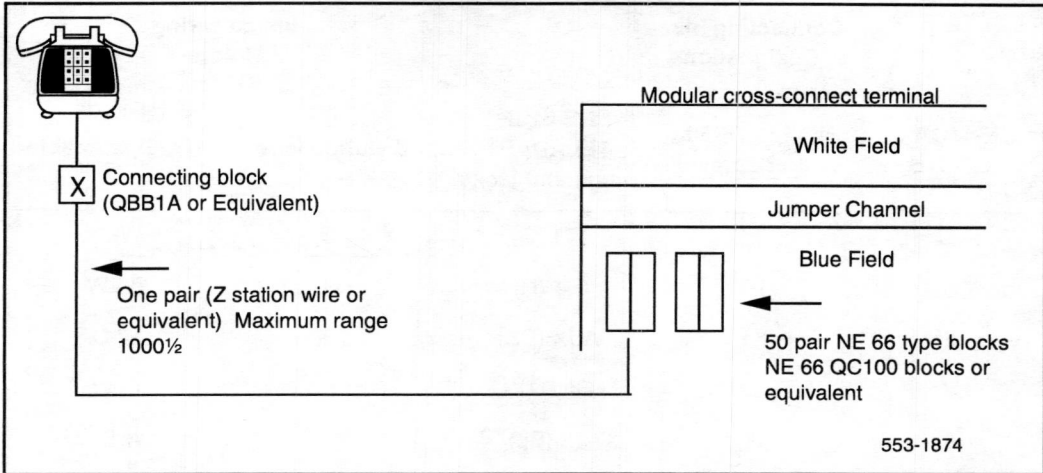
For a list of terminal connections, see Table 1.

**Figure 2**  
**Zone cabling and conduit assignment**





**Figure 3**  
**NE-500/2500-type telephones—limits and cabling**



**Procedure 1**  
**Installing wiring**

- 1 Assign a number to the wire or cable used.
- 2 Attach the assigned number to the wire or cable at the end nearest the telephone, using a cable marker.
- 3 Run the wire or cable between the telephone location and nearest cross-connect point (if not previously run).
- 4 Connect the cable or wire to the telephone connecting block.
- 5 Designate the telephone connecting block.
- 6 Cross-connect the pairs at intermediate cross-connect points (if required) and terminate at the cross-connect terminal.
- 7 Terminate leads at the cross-connect terminal and designate the blocks according to the house cable plan.

**Table 1**  
**Terminal connections**

Connecting block Designations			Inside wiring Colors	
NE-47QA or QBB1B	NE-284-74-500 1 adapter	NE-625F TELADAPT plugs and jacks	Z station wire	16/25-pair cable
G	1T	T1 (G)	G	W-BL
R	1R	R1 (R)	R	BL-W
BK	X1	AUX (BK)	BK	W-O
Y	X2	GND (Y)	Y	O-W
5	R	T2 (BL)		W-SL
6	B	R2 (W)		SL-W

## Normal operating ranges

**Telephones** The normal operating range for SL-1 telephones, with and without add-on modules, is 189  $\frac{3}{4}$  or 6000 cable feet (1830 m), whichever is reached first. For example:

22 AWG wire range = 6000 feet (1830 m)

24 AWG wire range = 3700 feet (1125 m)

26 AWG wire range = 2300 feet (700 m)

The outside plant cable must not exceed 1  $\frac{3}{4}$  per mile, or 189  $\frac{3}{4}$  per 6000 kilometers.

SL-1 telephones equipped with a QKK1 extension kit have a maximum range of 8000 feet (2440 m). For example:

22 AWG wire range = 8000 feet (2440 m)

24 AWG wire range = 5500 feet (1675 m)

26 AWG wire range = 3690 feet (1125 m)

The outside plant cable must not exceed 0.085  $\frac{3}{4}$  per mile, or 189  $\frac{3}{4}$  per 6000 kilometers.

**Note:** The 24 V and 15 V supplies can be obtained from the QUT1 centralized power supply located at the cross-connect terminal. A separate fuse must be used for each set.

Meridian Modular Telephones have a maximum permissible loop length of 3500 ft (915 m), assuming 24 AWG (0.5 mm) wire with no bridge taps. A 15.5 dB loss at 256 kHz defines the loop length limit.

**Attendant consoles** The normal operating range for the QCW1C (or earlier vintage) and QCW2A attendant consoles, with and without add-on modules, is 189  $\frac{3}{4}$  or 6000 cable feet (1830 m), whichever is reached first. For example:

22 AWG wire range = 6000 feet (1830 m)

24 AWG wire range = 3700 feet (1125 m)

26 AWG wire range = 2300 feet (700 m)

The normal operating range of the QCW1D and QCW2B (or later vintage) attendant consoles is 8000 cable feet (2440 m) using cable rated at a maximum of 0.085  $\frac{3}{4}$  per mile (1600 m). For example:

22 AWG wire range = 8000 feet (2440 m)

24 AWG wire range = 5500 feet (1675 m)

26 AWG wire range = 3690 feet (1125 m)

The normal operating range of the M1250 attendant console is 8000 cable feet (2440 m) using cable rated at a maximum of 0.085  $\frac{3}{4}$  per mile (1600 m). For example:

22 AWG wire range = 8000 feet (2440 m)

24 AWG wire range = 5500 feet (1675 m)

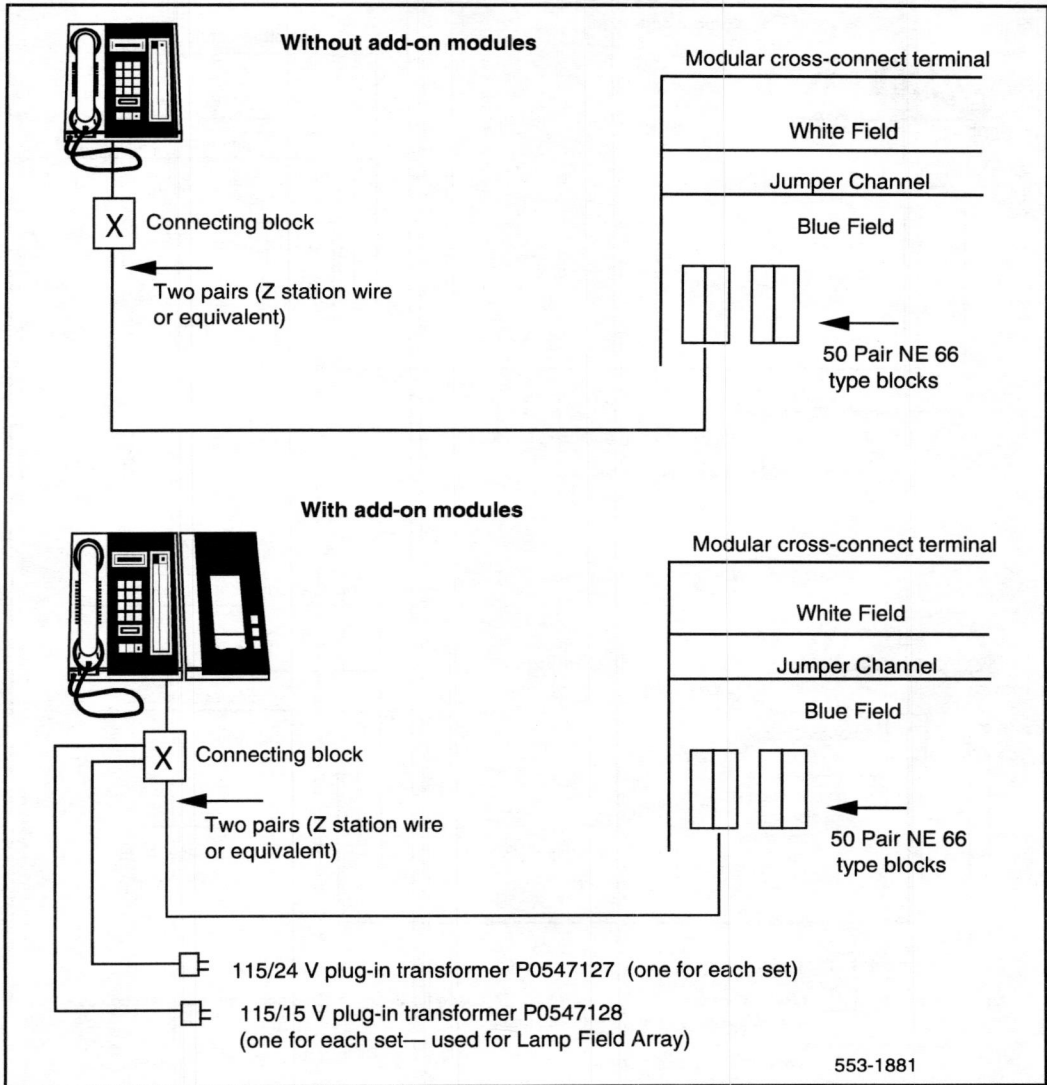
26 AWG wire range = 3690 feet (1125 m)

**Note:** The 24 V and 15 V supplies can be obtained from QUT1 centralized power supply located at the cross-connect terminal. A separate fuse must be used for each console. You can also obtain 24 V of power from a QPC61 line card. The maximum resistance is 30  $\frac{3}{4}$ .

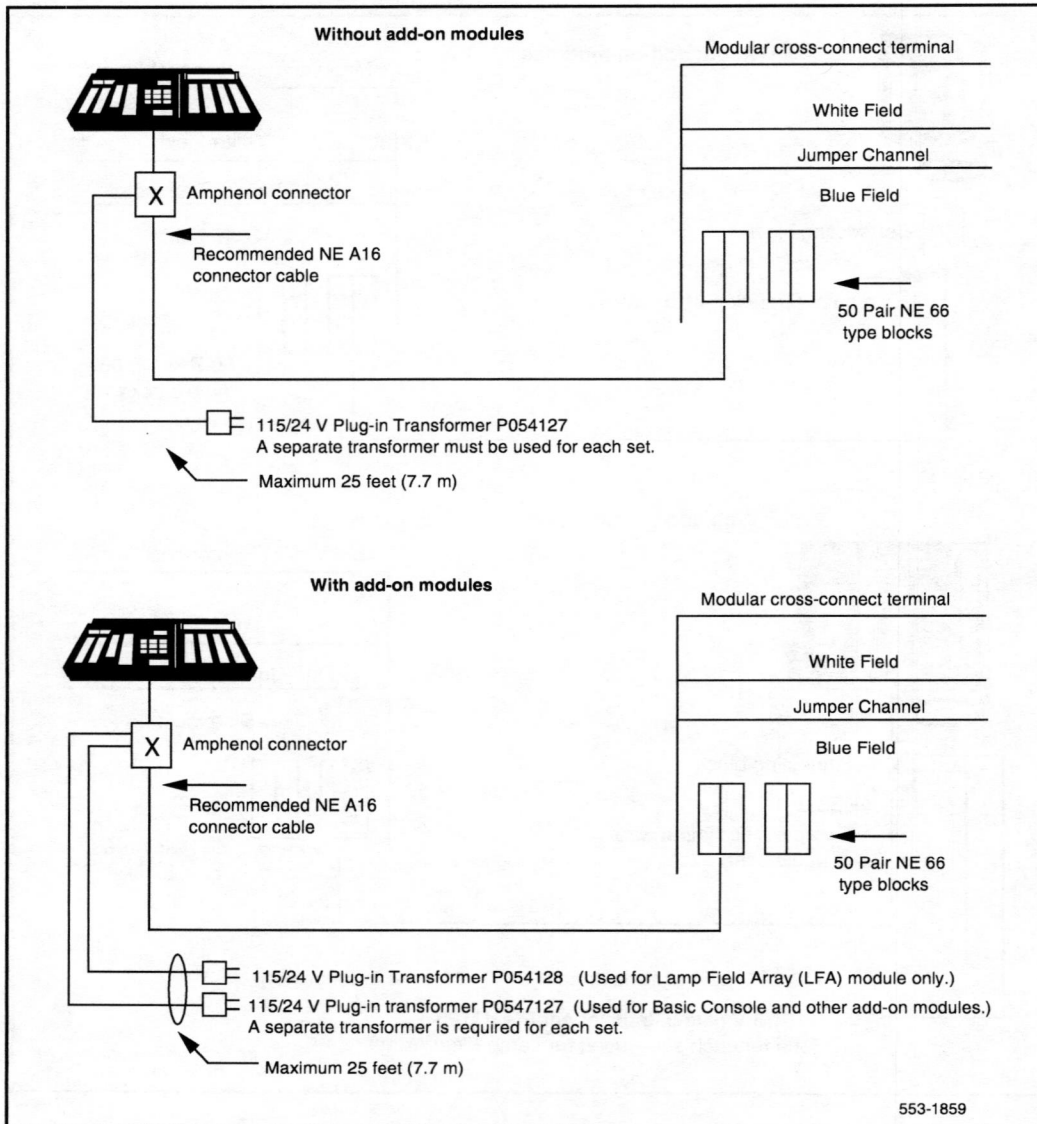
The outside plant cable must exceed 1  $\frac{3}{4}$  per mile, or 189  $\frac{3}{4}$  per 6000 kilometers.

M2250 attendant consoles have a maximum permissible loop length of 3500 ft (915 m), assuming 24 AWG (0.5 mm) wire with no bridge taps. A 15.5 dB loss at 256 kHz defines the loop length limit.

**Figure 4**  
**SL-1 telephones—limits and cabling**



**Figure 5**  
**QCW-type attendant console—limits and cabling**



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## Attendant consoles

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This section describes installation instructions for the QCW and M1250/2250 attendant consoles. For Meridian 1 Attendant PC Software installation instructions, refer to the *Meridian 1 Attendant PC Installation Guide*.

### Packing and unpacking

Use proper care while unpacking any attendant console. Check for damaged containers so that appropriate claims can be made to the transport company for items damaged in transit.

If an attendant console must be returned to the factory, pack it in the appropriate container to avoid damage during transit. Remember to include all loose parts (cords, handset, power unit, labels, and lenses) in the shipment.

### Installation and removal

Use the following procedures to install and remove QCW and M1250 attendant consoles.

**Note:** Although QCW and M1250/M2250 attendant consoles do not require a static discharge ground connection, the connection should be installed to protect any earlier vintage attendant consoles that may be used as replacements.

Choose a clean, level work surface and place several sheets of soft, clean paper between the attendant console and the work surface. This will prevent scratching or otherwise damaging the top cover, the liquid crystal display (LCD) indicators and screen, and the feature keys of the attendant console.



**Procedure 2**  
**Installing QCW attendant consoles**

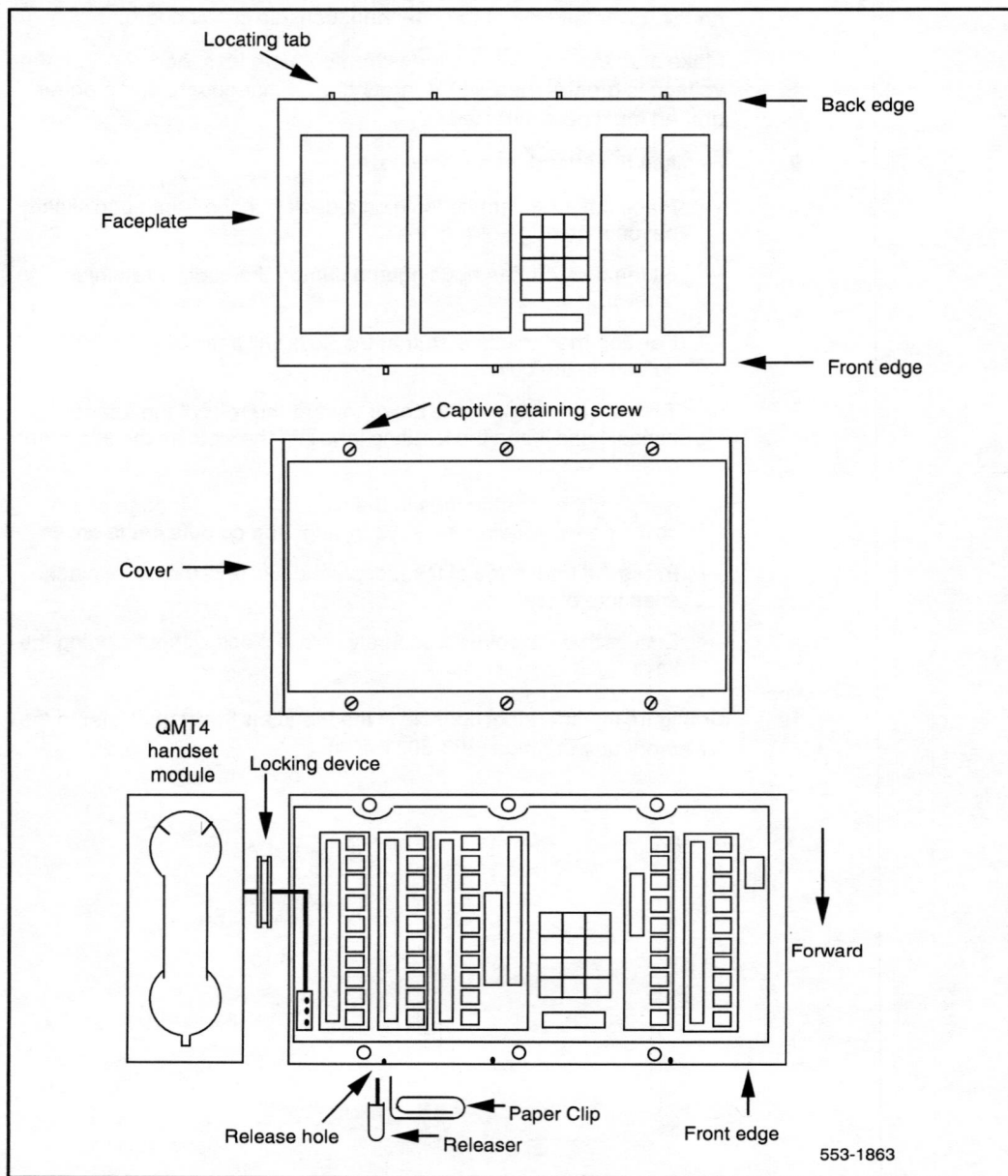
- 1**    Ensure that a 16-pair or 25-pair cable equipped with a 25-pair Amphenol connector is installed at the attendant console's location.
- 2**    Unpack and inspect the attendant console for damage. If the attendant console is damaged, notify your supplier.
- 3**    Designate the attendant console according to the features provided (see Procedure 8 and Figure 6).
- 4**    Connect the Amphenol connector on the attendant console line cord to the Amphenol connector on the attendant console cable.
- 5**    Cross-connect the attendant console at the cross-connect terminal (see Procedure 9).
- 6**    Using a minimum of 24 AWG cross-connect wire, connect a static discharge ground (use a water pipe or the building main ground system) to pins 15 and 40 (slate-black pair) of the attendant console cable at the cross-connect terminal nearest the attendant console location. Connect the ground within 200 ft (68 m) of the attendant console using an approved ground connector or a clamp. Do not connect the attendant console to the Meridian 1 system ground.
- 7**    Remove the cover from the attendant console:
  - Place the attendant console on a desk with the front edge slightly beyond the edge of the desk.
  - Insert a paper clip into each release hole in the front edge of the attendant console housing.
  - Press the releaser through the release hole inward against the cover until the cover releases.
  - Lift off the cover.
  - Unscrew the captive retaining screws securing the cover to the housing.
  - Remove the cover.

- 8** With a voltmeter, measure the AC and DC voltages between the metal frame of the attendant console and the quick-connect terminal VSS1A on the lower left side of the attendant console circuit board.

Make sure that the voltage measurements are less than  $\pm 40$  V. If the voltage is greater than  $\pm 40$  V, grounding is inadequate and a better ground must be connected.

- 9** Replace the attendant console cover:
  - Place the attendant console on a desk with the front edge slightly beyond the edge of the desk.
  - Fit the cover to the housing and tighten the captive retaining screws.
  - Position the faceplate so that the keys will pass through the cutouts in the cover.
  - Tilt the back edge of the cover toward the rear of the attendant console and insert the locating tabs into the slots on the attendant console cover.
  - Keeping the locating tabs in the slots, tilt the front edge of the cover down, passing the keys through the cutouts in the cover.
  - Press the front edge of the faceplate down until the cover catches snap into place.
  - Ensure that the cover is securely held in place without binding the keys.
- 10** Configure the attendant console in the Meridian 1 system. Refer to the *X11 input/output guide* (553-3001-400).

**Figure 6**  
**Typical QCW-type attendant console faceplate layout**



**Procedure 3**  
**Installing the M1250/M2250 attendant consoles**

- 1 Ensure that a 16-pair or 25-pair cable equipped with a 25-pair Amphenol connector is installed at the attendant console's location.
- 2 Unpack and inspect the attendant console for damage. If the console is damaged, notify your supplier.
- 3 Designate the console according to the features provided.
- 4 Connect the Amphenol plug on the attendant console to the Amphenol jack coming from the Main Distribution Frame (MDF).
  - Fasten the Amphenol connectors together and secure the captive screws on the cable.
  - Ensure that the connectors are secured in a connector mounting, if provided, or to the wall. Do not leave connectors unprotected on the floor.
- 5 Add a line circuit for the attendant console, if not already done. Refer to *Circuit card installation and testing* (553-3001-211).
- 6 Cross-connect the attendant console at the cross-connect terminal (see Procedure 9).
- 7 Enter the related attendant console data in the Meridian 1 system. Refer to the *X11 input/output guide* (553-3001-400).
- 8 Test the console features using the attendant console user guide.

**Note:** Refer to *Circuit card installation and testing* (553-3001-211) for circuit card installation procedures.

#### Procedure 4

##### Removing the M1250 and M2250 attendant consoles

- 1 Remove related attendant console data from the system memory. Refer to the *X11 input/output guide* (553-3001-400).
- 2 Locate and remove cross-connections from the attendant console cable at the cross-connect terminal (see Procedure 9).
- 3 Remove the circuit card if required. Refer to *Circuit card installation and testing* (553-3001-211).

**Note:** Do not remove the circuit card if any of the remaining units on the card are assigned.

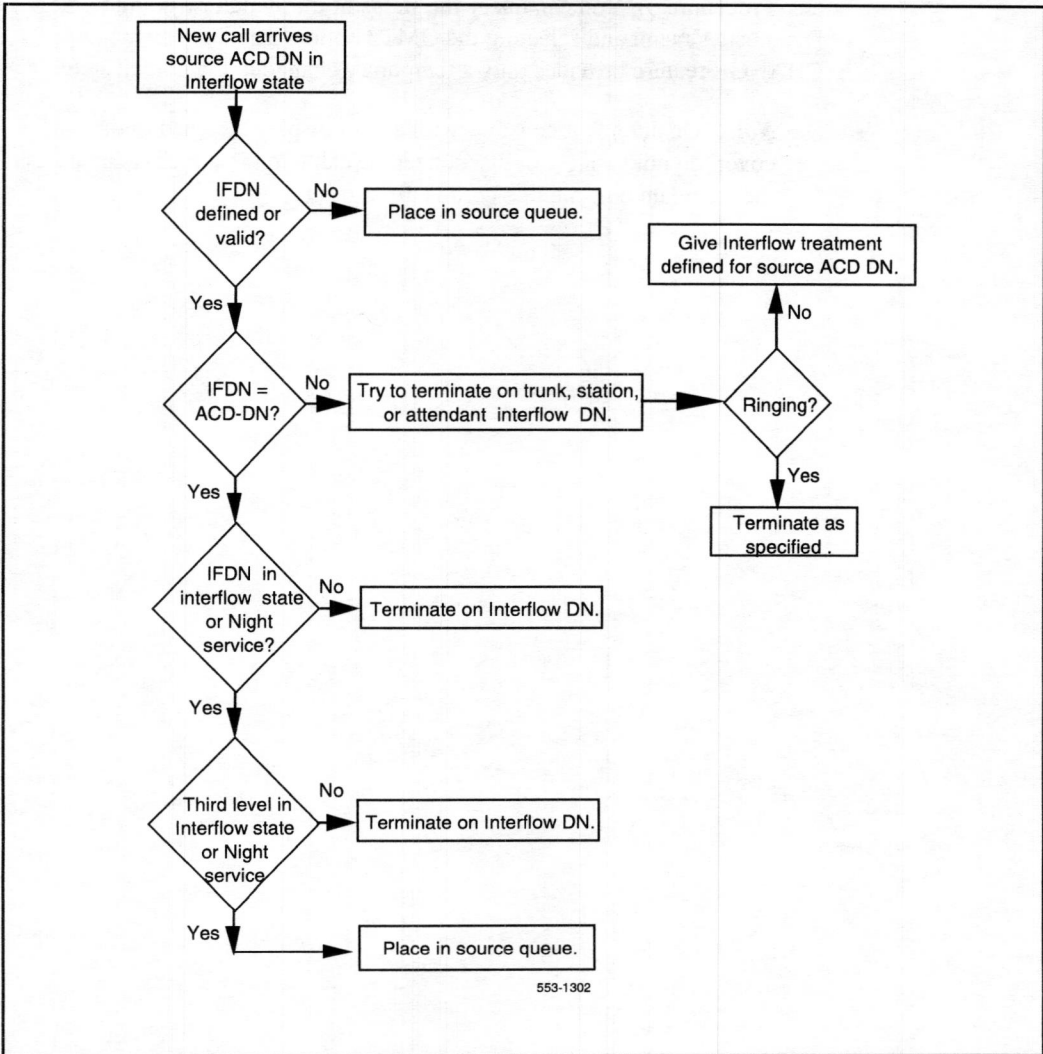
- 4 Disconnect the Amphenol connector on the end of the cable that leads to the cross-connect terminal from the connector on the cable leading to the attendant console.
- 5 Pack the attendant console, handset, and cords in a suitable container.

#### Procedure 5

##### Removing the M1250/M2250 attendant console top cover

- 1 Disconnect any plugs and cords from the attendant console.
- 2 Remove the ten 10-mm fastening screws in the flange of the attendant console, as well as one 10-mm and one 40-mm screw on the base of the attendant console (see Figure 7 for the M2250 assembly drawing).
- 3 Holding the top cover and the base together by hand, turn the attendant console right-side up and place it back on the work surface.
- 4 Carefully lift the faceplate straight up and disconnect the following cable connections:
  - on the M1250
    - J1—16-pin plug ribbon cable
    - J2—16-pin plug ribbon cable
  - on the M2250
    - J2—20-pin plug ribbon cable

**Figure 7**  
**M2250 assembly drawing (exploded view)**



When you are setting the QMT2 switch on the M1250 attendant console's PCB, ON indicates that the QMT2 is enabled, and OFF indicates it is disabled (see Procedure 6). You can query the status of the switch by going to the Diagnostics menu and selecting the QMT2 option. The Display menu CHANGE feature provides only a temporary change to the QMT2 status.

**Note:** On attendant consoles with a digit display attached to the top cover, do not connect or disconnect the cable to the digit display unless the attendant console line cord is disconnected.



## Procedure 6

### Installing the M1250/M2250 attendant console top cover

- 1 Set the QMT2 dip switch. To locate the dip switch, look at the attendant console from the top. The QMT2 dip switch is the only dip switch on the topmost circuit board. Set the switch to ON (enable QMT2) or OFF (disable QMT2).

**Note:** The QMT2 feature must be enabled in system software. Refer to LD 12 in the *X11 input/output guide* (553-3001-400).

- 2 Carefully lift the top cover straight up and make the following cable connections:

- on the M1250
  - J1—16-pin plug ribbon cable
  - J2—16-pin plug ribbon cable
  - J7—2-pin speaker lead
- on the M2250
  - J2—20-pin plug ribbon cable

- 3 Put the top cover back on the attendant console:

- Place the top cover onto the base housing, and turn the attendant console upside down.
- Reinsert and tighten the ten 10-mm fastening screws on the flange.
- Reinsert and tighten one 10-mm and one 40-mm fastening screw on the back.

- 4 Return the attendant console to its working position, reconnect the plugs and cords, and test the features.

**Procedure 7**

**Loopback test on the M1250 and M2250 attendant consoles**

- 1**     Make a loopback connector. Prepare a blank 25-way RS-232 plug by internally connecting pins 2 and 3 together with strapping wire.
- 2**     Press the Shift key. This accesses Level 1 mode.
- 3**     Press the F4 Function key to access the Diagnostics menu on the liquid crystal display (LCD) screen.
- 4**     Plug the loopback connector into the Data Port RS-232 jack in the back of the console.
- 5**     Select the Data Port option from the Diagnostics menu by dialing "3". The LCD screen displays OK when the test is successfully completed.

If there is a hardware fault in the M1250, 90H is displayed. If there is a hardware fault on the M2250, A0H is displayed.

If the blank RS-232 connector is not plugged into the data port correctly (Step 4), the display will read 90H or A0H.

- 6**     Press the Asterisk (\*) key to repeat the test.
- 7**     To exit the test mode press the octothorpe (#). This returns you to the main Diagnostics menu.
- 8**     Press the octothorpe to return to normal operating mode.
- 9**     Remove the loopback connector from the Data Port RS-232 jack.

## Designating attendant consoles

Refer to the work order to determine the features and key designations for each attendant console. Designate each key on the attendant console by placing its feature name (from the designation sheet) in the key cap that fits on the key.

For the QCW-type attendant console, the directory number (DN) designation window is located beneath the keypad on the face of the attendant console. The DN designation window on the M1250 attendant console is located above the keypad.

### Procedure 8

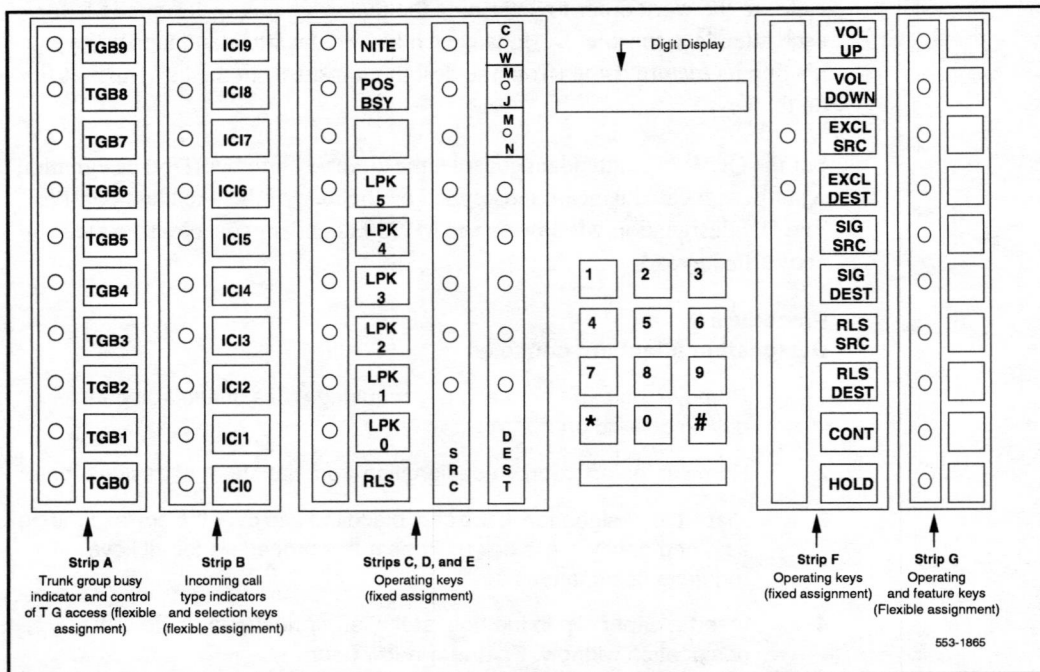
#### Designating attendant consoles

- 1 Remove the cap from each key requiring a designation by gently pulling upward on the cap.
- 2 Remove the appropriate designation from the sheet of designations.
- 3 Place the designation in the cap, place the cap over the corresponding key, and gently press down. Repeat this procedure for all keys requiring designations.
- 4 Insert a paper clip in the hole at the left or right end of the DN designation window. Pry the window open.
- 5 Insert the number tag, and replace the designation window.

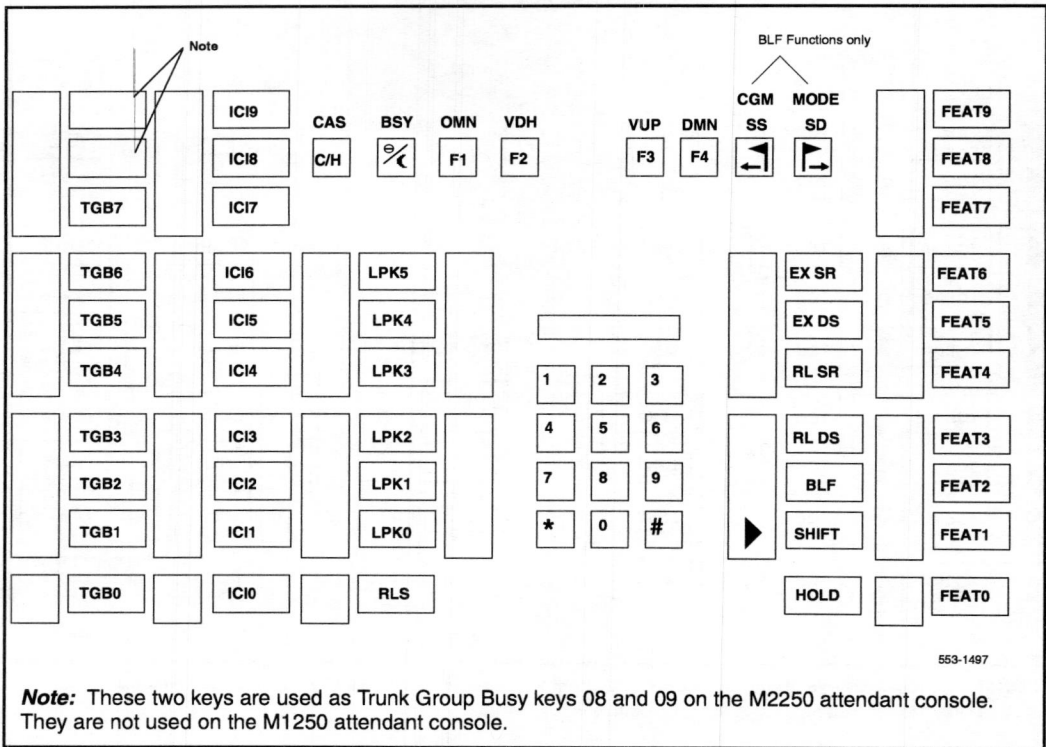
The following figures show the typical key designations for QCW-type and M1250 attendant consoles:

- Figure 8 shows the QCW attendant console designations.
- Figures 9 and 10 show the key designations for the M1250/M2250 attendant console in Shift mode.
- Figures 11 and 12 show the M1250/M2250 attendant console in Unshift mode.

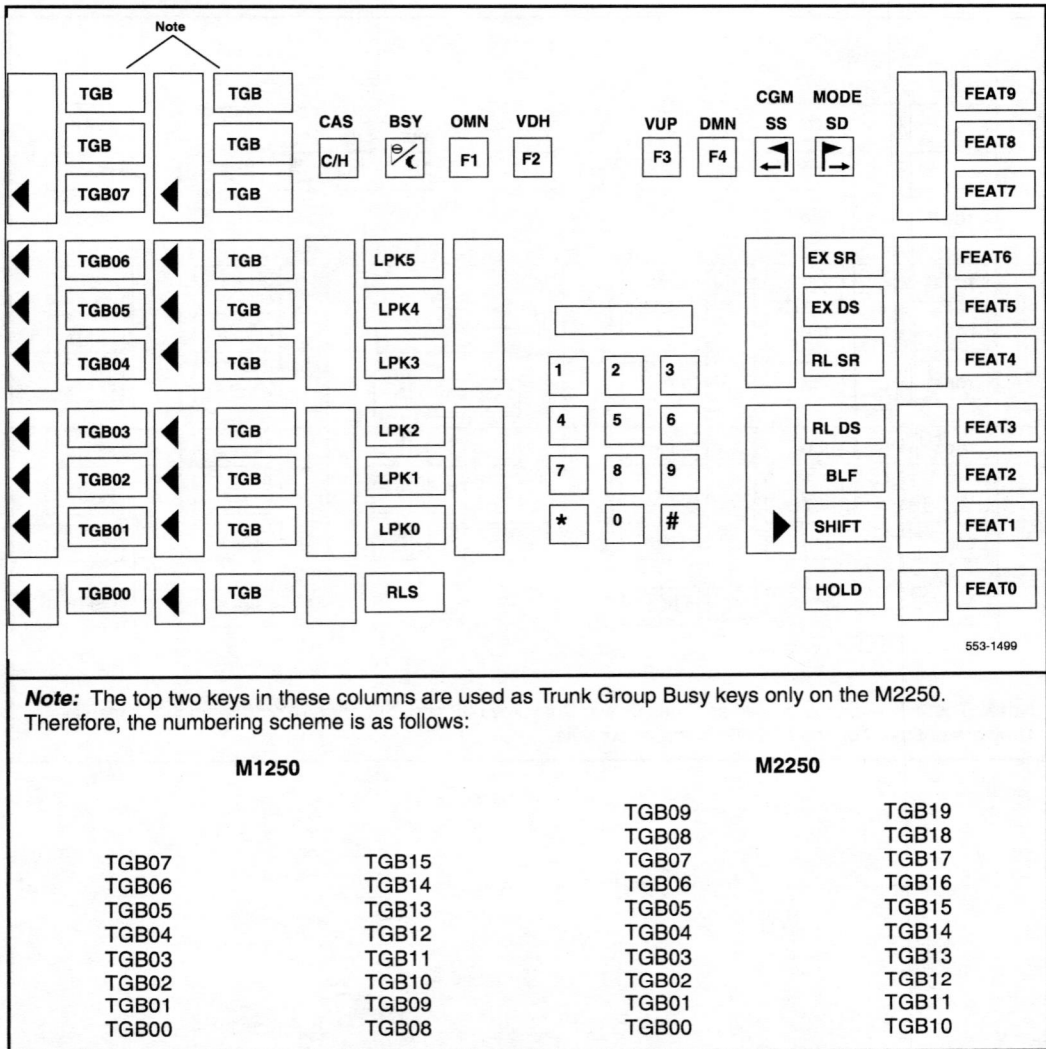
**Figure 8**  
**Typical key designations for the QCW attendant console**



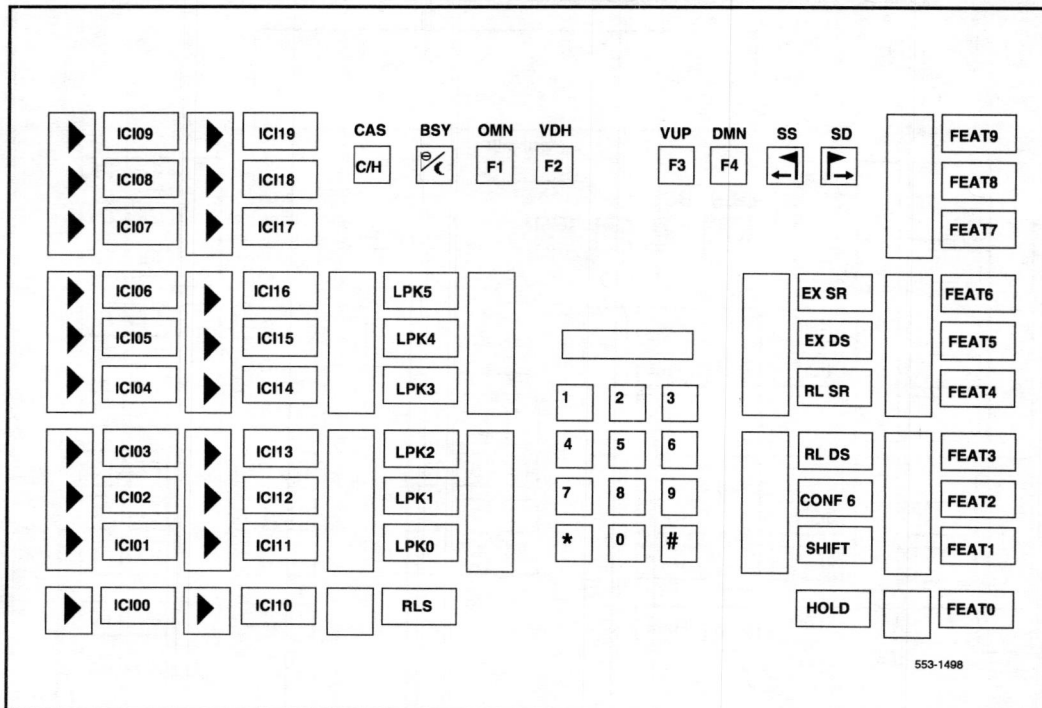
**Figure 9**  
**M1250/M2250 key designations in Shift mode (QMT2 not enabled)**



**Figure 10**  
**M1250/M2250 key designations in Shift mode (QMT2 enabled)**

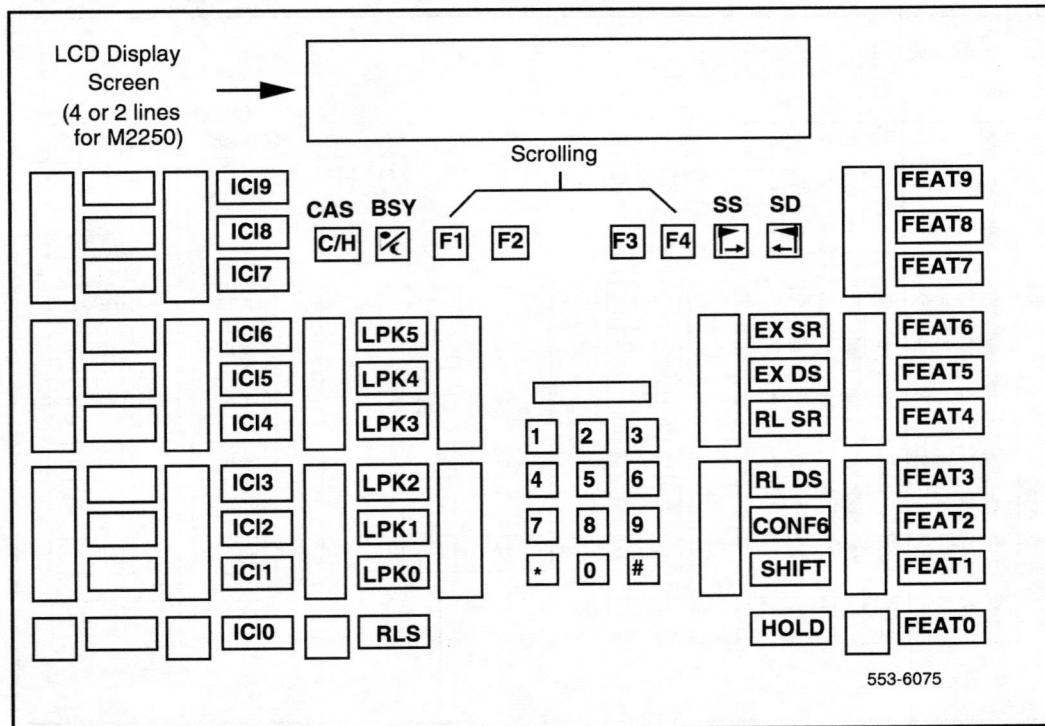


**Figure 11**  
**M1250/M2250 key designations in Unshift mode (QMT2 enabled)**





**Figure 12**  
**M1250/M2250 designations in Unshift mode (QMT2 not enabled)**



## Cross-connecting attendant consoles

Terminations are located on the vertical side of the distributing frame when frame-mounted blocks are used and in the blue field when wall-mounted blocks are used.

Line circuit card (TN) terminations are located on the horizontal side of the distributing frame when frame-mounted blocks are used and in the white field when wall-mounted blocks are used.

### **Procedure 9**

#### **Cross-connecting attendant consoles**

- 1**      Locate the attendant console terminations at the cross-connect terminal.
- 2**      Connect Z-type cross-connecting wire to the leads of the attendant console.
- 3**      Locate the line circuit card (TN) terminations.
- 4**      Run and connect the other end of the cross-connecting wire to the assigned TN terminal block.

See Table 2 for details on Z-type cross-connecting wire and Table 3 for a list of inside wiring colors.

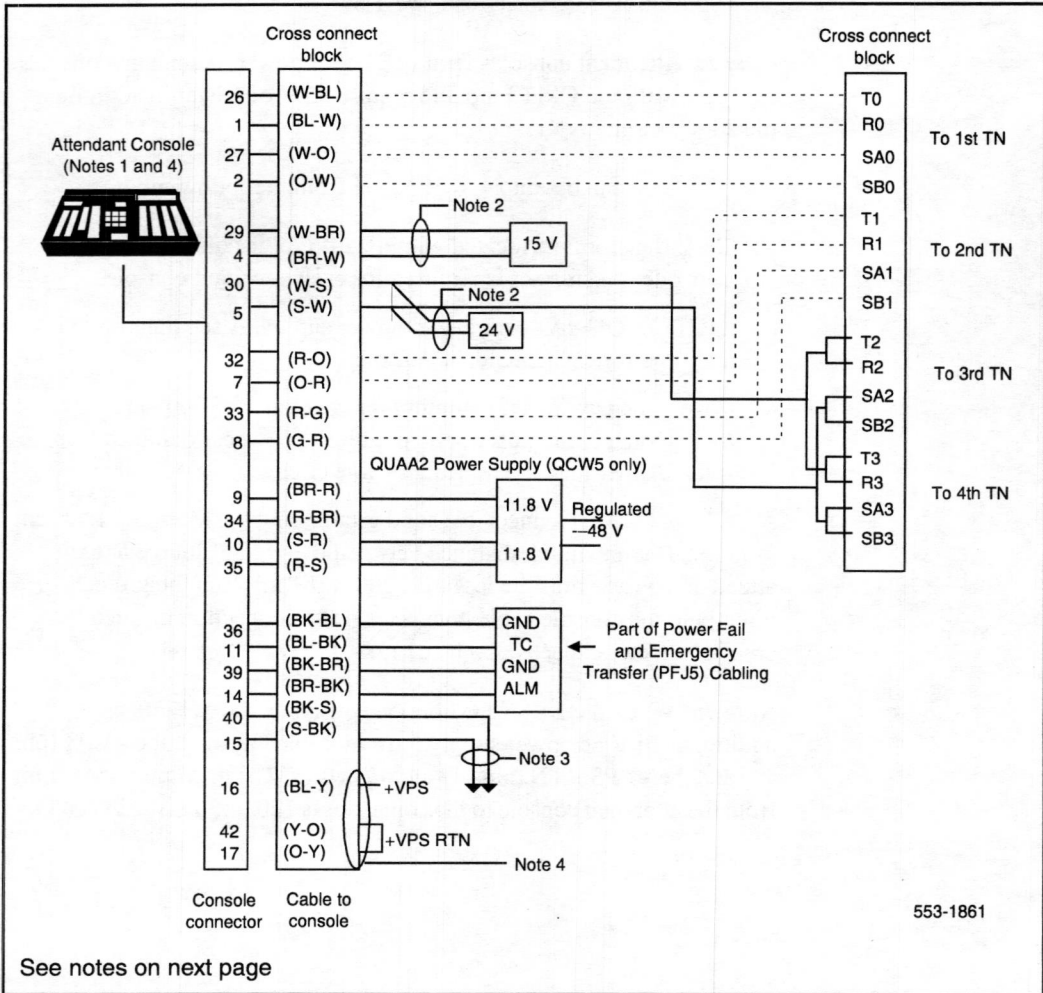
**Table 2**  
**Z-type cross-connecting wire**

Size	Gauge	Color	Designation
1 pr	24	Y-BL	Tip
		BL-Y	Ring
3 pr	24	W-BL	Voice T
		BL-W	Voice R
		W-O	Signal T
		O-W	Signal R
		W-G	Power
		G-W	Power

**Table 3**  
**Inside wiring colors**

Z station wire	16/25-pair cable	Connect to equipment TN
G	W-BL	First pair Tip
R	BL-W	First pair Ring
BK	W-O	Second pair Tip
Y	O-W	Second pair Ring

**Figure 13**  
**QCW and M1250 attendant console cross-connections**



The following notes refer to Figure 13, which illustrates QCW and M1250 attendant console cross-connections. For a listing of the QCW and M1250 attendant console cross-connections, see Table 4.

**Note 1:** Attendant consoles require 24 V of power. Attendant consoles equipped with the QMT3 module require 15 V of power in addition to the 24 V power supply.

**Note 2:** You can obtain 24 V of power from the following:

- 24 V transformers located within 25 ft (7.7 m) of the console. A separate transformer is required for each attendant console.
- QUT1 or QUAA1 centralized power supply. A separate fuse is required for each attendant console.
- Two circuits with a maximum loop resistance of  $300\frac{3}{4}$ . This cross-connection must not be used if the power is obtained from a source other than the Meridian 1 line circuit.

**Note 3:** (M1250) Connect to a solid ground (not the Meridian 1 system ground). The maximum distance between the ground source and the attendant console must be less than 200 ft (61 m). Run the ground directly to the console cable connector if the connection through the cross-connector exceeds 200 ft (61 m).

**Note 4:** When the BLF/CGM option is used on the M1250, an additional 16 V dc power supply must be cabled through the +VPS (pin 16) and the +VPS RTN (pins 42 and 17) wires. The maximum loop limit from the attendant console to the connector is 120 ft (36 m) at 24 AWG.

**Table 4**  
**QCW and M1250 attendant console cross-connections (Part 1 of 2)**

Mounting cord	16/25-pair Connector Cable				
Lead designation	Pin number	Pin number	Pair number	Color	Connected to
Voice 1 (SRC)	26	26	1T	W-BL	First pair of TN #1
	1	1	R	BL-W	
Signal 1 (SRC)	27	27	2T	W-O	Second pair of TN #1
	2	2	R	O-W	
Spare	28	28	3T	W-G	
	3	3	R	G-W	
15 V of power	29	29	4T	W-BR	P0547128 (Note 1)
15 V of power	4	4	R	BR-W	Plug-in transformer
25 V of power	30	30	5T	W-S	P0547127 (Notes 1 and 2) Plug-in transformer
25 V of power	5	5	R	S-W	
Spare	31	31	6T	R-BL	
	6	6	R	BL-R	
Voice 2	32	32	7T	R-O	First pair of TN #2
Voice (DEST)	7	7	R	O-R	
Signal 2	33	33	8T	R-G	Second pair of TN #2
Signal (DEST)	8	8	R	G-R	
GRD 11.8 V	34	34	9T	R-BR	QUAA2 power supply (QCW5 only)
	9	9	R	BR-R	
GRD 11.8 V	35	35	10T	R-S	QUAA5 power supply (QCW5 only)
	10	10	R	S-R	

**Table 4**  
**QCW and M1250 attendant console cross-connections (Part 2 of 2)**

Mounting cord	16/25-pair Connector Cable				
	Pin number	Pin number	Pair number	Color	Connected to
Emergency transfer	36	36	11T	BK-BL	GND (Note 3)
	11	11	R	BL-BK	TC (Note 4)
Spare	37	37	12T	BK-O	
Spare	12	12	R	O-BK	
Spare	38	38	13T	BK-G	
Spare	13	13	R	G-BK	
Major	39	39	14T	BK-BR	GND (Note 3)
Alarm	14	14	R	BR-BK	ALM (Note 4)
GND	40	40	15T	BK-S	See static discharge
				GND	
GND	15	15	R	S-BK	Installation procedure
spare	41	42-45	16T	Y-BL	
	16	16-2	R	BL-Y	

**Note 1:** The 15-V and 25-V supplies can be obtained at the cross-connect terminal when a QUT1 power supply is provided.

**Note 2:** The 25-V supply can also be obtained from two additional units on a line circuit card.

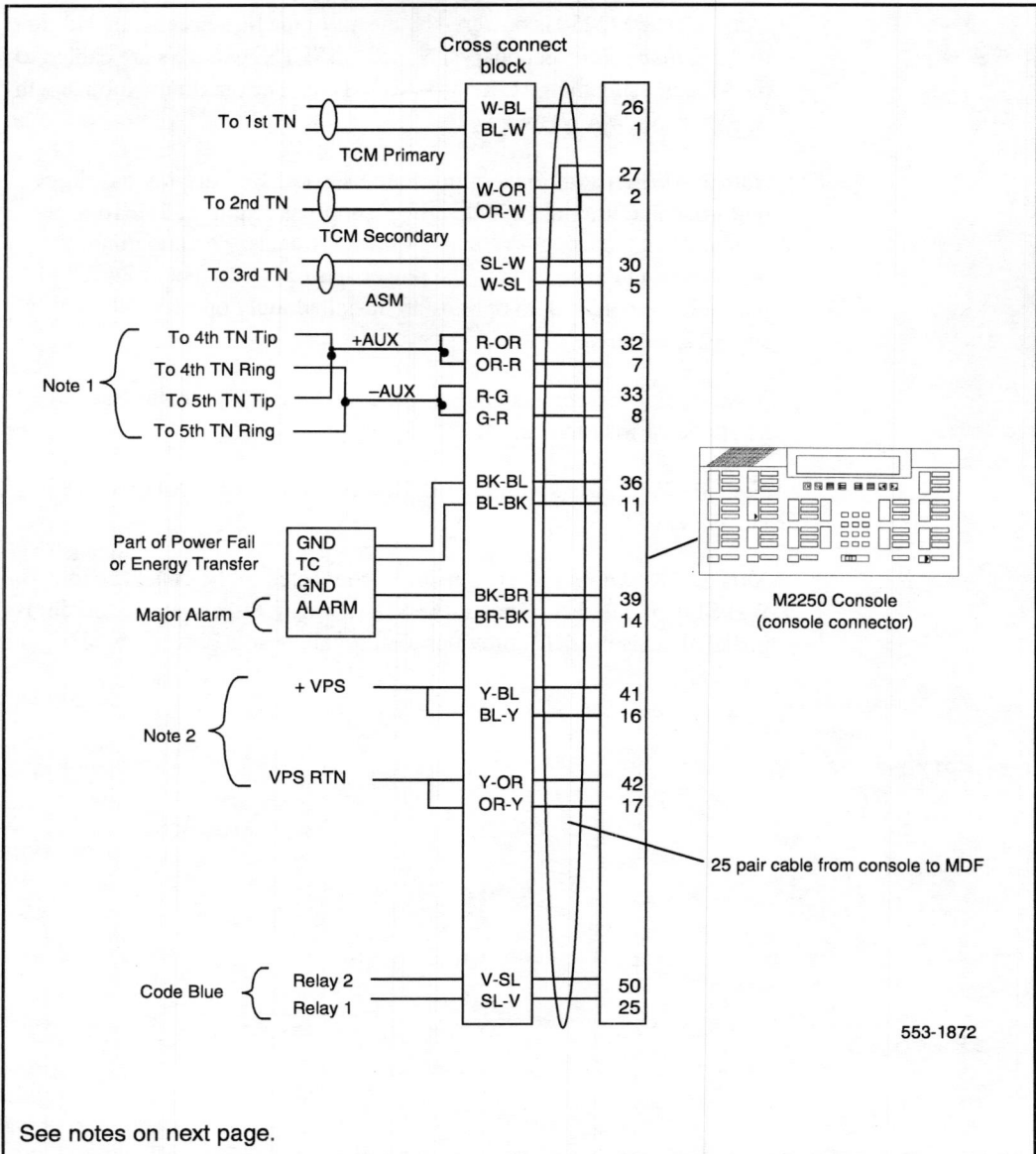
**Note 3:** Connect to Pin 3 or 28 of the appropriate PFJ5 terminal block.

**Note 4:** Connect TC to Pin 29 or 5 and ALM to Pin 4 or 31 of the appropriate PFJ5 terminal block.

**Note 5:** This applies to QPC297 and QPC61 circuit cards.



**Figure 14**  
**M2250 attendant console cross-connections**



The following notes refer to Figure 14, which illustrates the M2250 attendant console cross-connections.

**Note 1:** The M2250 is powered by means of the line circuits. In addition to the primary TN, secondary TN, and ASM TN, two TNs are cabled to the M2250 using the +AUX and -AUX leads. The maximum loop length is 3000 ft of 24 AWG wire.

**Note 2:** When additional options are used (BLF or display backlight option), an additional 16 V dc power supply is required. The 16 V dc source is cabled using +VPS and VPS RTN leads. The maximum distance from the console to the power source is 120 feet of 24 AWG wire. Please note if both options are installed, only one 16 V dc power supply is required.

**Note 3:** It is recommended that five consecutive TNs on the line circuit be allocated for each console.

**Note 4:** When used with the ISDLC, the M2250 requires QPC578 vintage D or later.

**Note 5:** The third TN must be cross-connected to the console cable WH/SL pair whether or not an ASM (Attendant Supervisory Module) is installed. This third TN provides additional console power which is required.

Table 5 explains where each M2250 cable pair is connected. Table 6 lists the M2250 typical cross-connections.

**Table 5**  
**M2250 attendant console connections (Part 1 of 2)**

Mounting cord  Lead designation	16/25-pair connector cable			
	Pin number	Pair number	Color	Connected to
TCM primary	26	1T	W-BL	TN #1
	1	R	BL-W	
TCM secondary	27	2T	W-O	TN #2
	2	R	O-W	
Attendant Supervisory Module	30	5T	W-SL	TN #3
	5	R	SL-W	
Spare	31	6T	R-BL	
	6	R	BL-R	
+AUX	32	7T	R-O	TN #4
	7	R	O-R	
-AUX	33	8T	R-G	TN #5
	8	R	G-R	
Spare	34	9T	R-BR	
	9	R	BR-R	
Spare	35	10T	R-SL	
	10	R	SL-R	
Power Fail or Energy Transfer	36	11T	BK-BL	GND (Note 1)
	11	R	BL-BK	TC (Note 2)

**Table 5**  
**M2250 attendant console connections (Part 2 of 2)**

Mounting cord  Lead designation	16/25-pair connector cable			
	Pin number	Pair number	Color	Connected to
Spare	37	12T	BK-O	
Spare	12	R	O-BK	
Spare	38	13T	BK-G	
Spare	13	R	G-BK	
GND	39	14T	BK-BR	GND (Note 1)
Major Alarm	14	R	BR-BK	ALM (Note 2)
Spare	40	15T	BK-SL	
	15	R	SL-BK	
VPS	41	16T	Y-BL	
	16	R	BL-Y	
VPS RTN	42	17T	Y-O	
	17	R	O-Y	
Spare				
Code Blue	50	25T	Y-SL	Relay 2
	25	R	SL-Y	Relay 1

**Note 1:** Connect to Pin 3 or 28 of the appropriate PFJ5 terminal block.

**Note 2:** Connect TC to Pin 29 or 5 and ALM to Pin 4 or 31 of the appropriate PFJ5 terminal block.

**Table 6**  
**M2250 typical cross-connections (Part 1 of 2)**

<b>Pair</b>	<b>Pins</b>	<b>Pair Color</b>	<b>DLC Connections</b>	<b>ISDLC Connections</b>
1T	26	W-BL	Unit	Unit
1R	1	BL-W	0	0
2T	27	W-O	Unit	Unit
2R	2	O-W	1	8
3T	28	W-G	Unit	Unit
3R	3	G-W	2	1
4T	29	W-BR	Unit	Unit
4R	4	BR-W	3	9
5T	30	W-S	Unit	Unit
5R	5	S-W	4	2
6T	31	R-BL	Unit	Unit
6R	6	BL-R	5	10
7T	32	R-O	Unit	Unit
7R	7	O-R	6	3
8T	33	R-G	Unit	Unit
8R	8	G-R	7	11
9T	34	R-BR	Unit	Unit
9R	9	BR-R	8	4
10T	35	R-S	Unit	Unit
10R	10	S-R	9	12
11T	36	BK-BL	Unit	Unit
11R	11	BL-BK	10	5
12T	37	BK-O	Unit	Unit
12R	12	O-BK	11	13

**Table 6**  
**M2250 typical cross-connections (Part 2 of 2)**

<b>Pair</b>	<b>Pins</b>	<b>Pair Color</b>	<b>DLC Connections</b>	<b>ISDLC Connections</b>
13T	38	BK-G	Unit	Unit
13R	13	G-BK	12	6
14T	39	BK-BR	Unit	Unit
14R	14	BR-BK	13	14
15T	40	BK-S	Unit	Unit
15R	15	S-BK	14	7
16T	41	Y-BL	Unit	Unit
16R	16	BL-Y	15	15

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# Telephones

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## Packing and unpacking

Use proper care while unpacking any digital telephone. Check for damaged containers so that appropriate claims can be made to the transport company for items damaged in transit.

If a telephone must be returned to the factory, pack it in the appropriate container to avoid damage during transit. Remember to include all loose parts (cords, handset, power unit, labels, and lenses) in the shipment.

## Installation and removal

On QSU71 telephones, key 8 must be assigned as NUL, and key 9 as RLS. Do not remove the circuit card if any remaining units on the card are assigned.

### Procedure 10

#### Installing 500/2500, SL-1, M1009, M1109, and M1309 telephones

- 1 Ensure that the wiring is installed at the telephone's location.
- 2 Unpack and inspect the telephone for damage. Assemble the handset and line cords if necessary.
- 3 Install the required designations on the telephone.
- 4 Connect the telephone to the connecting block or connector.
- 5 Cross-connect the telephone wiring at the cross-connect terminal.
- 6 Configure the telephone in the system. Refer to the *X11 input/output guide* (553-3001-400).



**Procedure 11**

**Removing 500/2500, SL-1, M1009, M1109, and M1309 telephones**

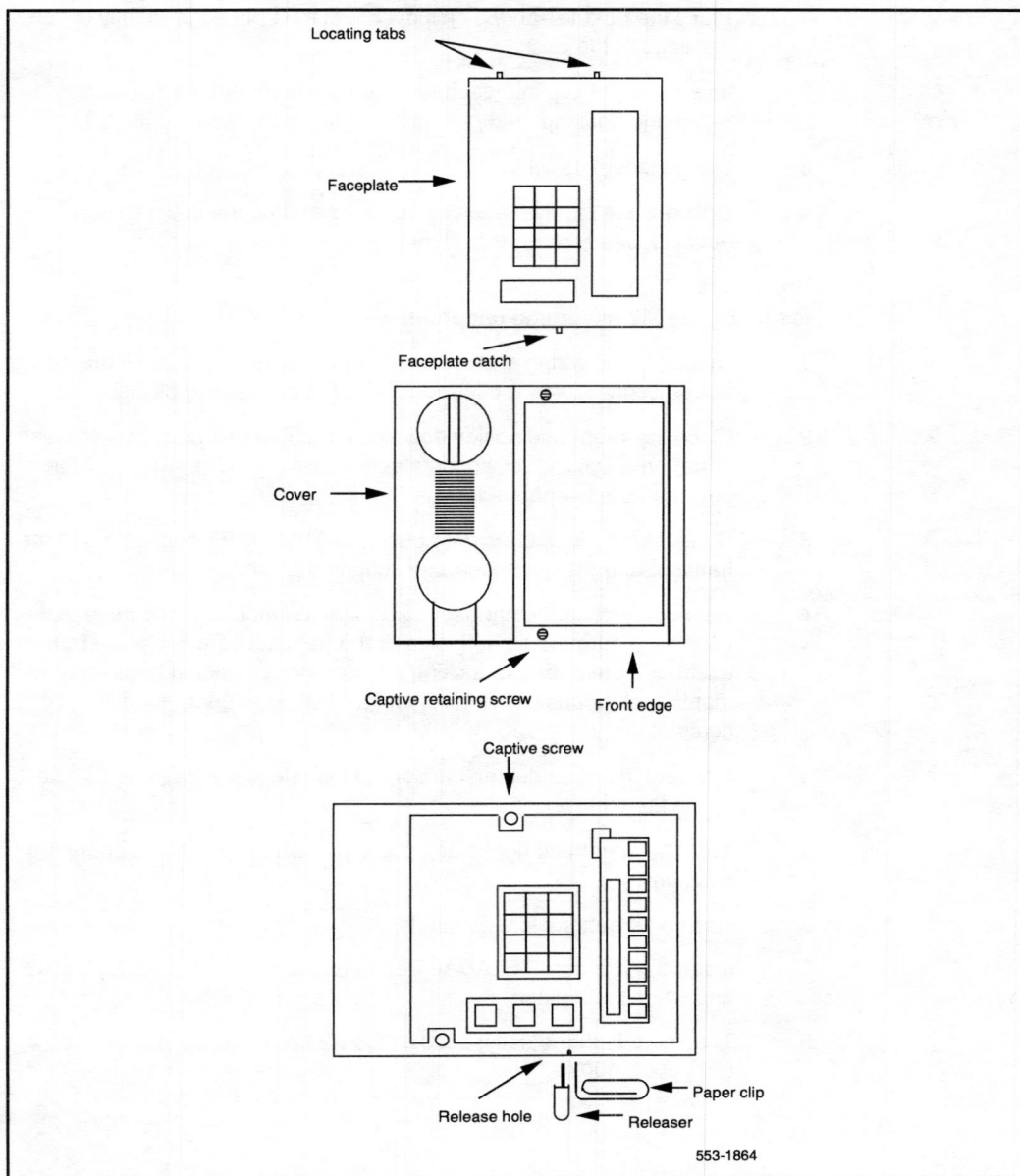
- 1      Remove telephone data from the system. Refer to the *X11 input/output guide* (553-3001-400).
- 2      Disconnect the telephone from the connecting block or connector.
- 3      Pack the telephone in a container.
- 4      If necessary, remove the cross-connections for the telephone at the cross-connect terminal.
- 5      Remove the line circuit card if required. Refer to *Circuit card installation and testing* (553-3001-211).

**Procedure 12**

**Installing the SL-1 telephone faceplate**

- 1      Place the telephone on a desk with the front edge slightly beyond the edge of the desk.
- 2      Fit the cover to the housing and tighten the captive retaining screws.
- 3      Position the faceplate so that the keys will pass through the cutouts in the faceplate (see Figure 15).
- 4      Tilt the back edge of the faceplate toward the rear of the telephone and insert the locating tabs into the slots on the cover.
- 5      Keeping the locating tabs in the slots, tilt the front edge of the faceplate down, passing the keys through the cutouts in the faceplate.
- 6      Press the front edge of the faceplate down until the faceplate catches snap into place.
- 7      Ensure that the faceplate is securely held in place without binding the keys.

**Figure 15**  
**SL-1 telephone faceplate**



### **Procedure 13**

#### **Removing the SL-1 telephone faceplate**

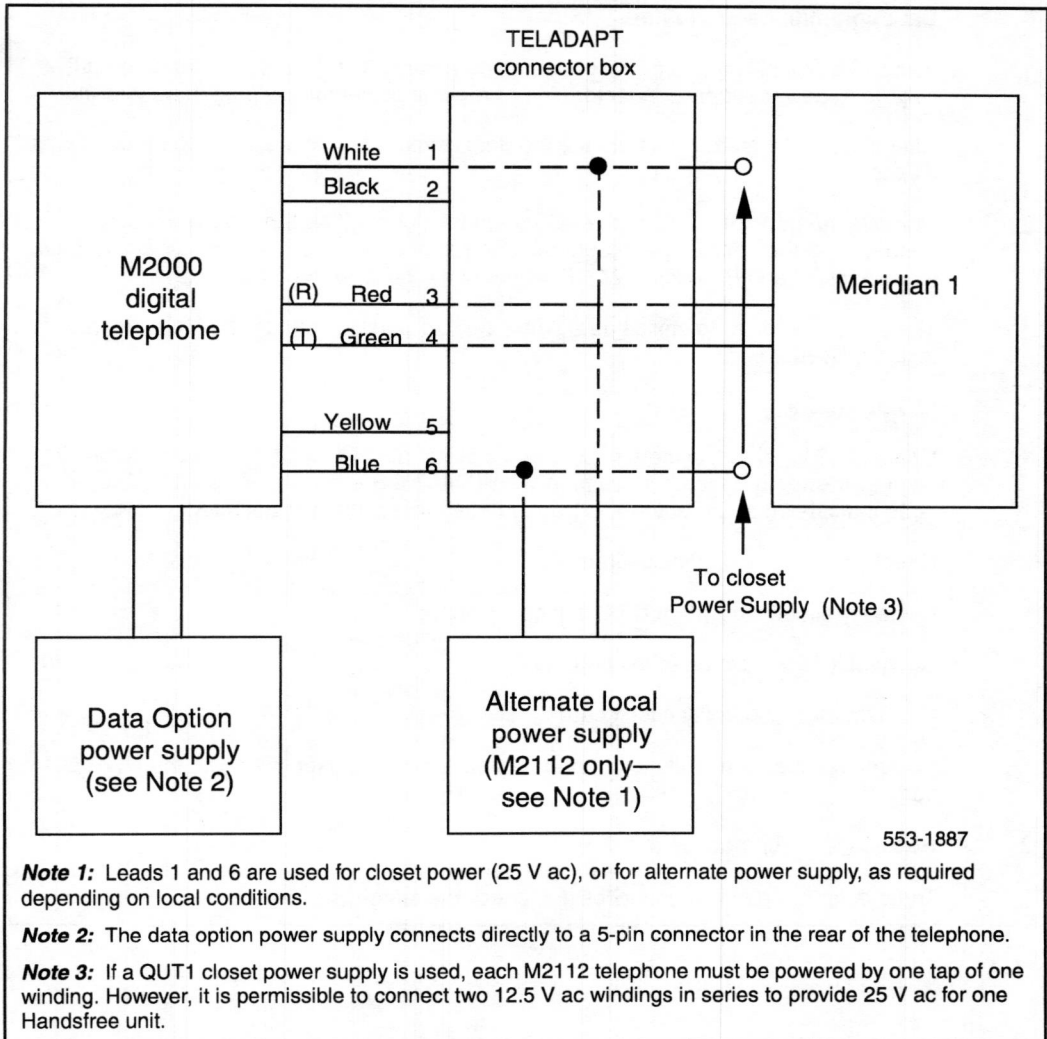
- 1      Place the SL-1 telephone on a desk with the front edge slightly beyond the edge of the desk.
- 2      Insert a paper clip into each release hole in the front edge of the telephone housing, and pry the faceplate open (see Figure 15).
- 3      Lift the faceplate off.
- 4      Unscrew the captive retaining screws securing the cover to the housing, and remove the cover.

### **Procedure 14**

#### **Installing the M2000 digital telephones**

- 1      Complete the wiring and cross-connections as shown in Figure 16 before connecting the telephone(s) to the connecting block(s).
- 2      Place the telephone upside down on a number of sheets of soft, clean paper on a solid, level work surface to prevent damage to movable keys and the telephone face.
- 3      Connect the handset cord 4-conductor TELADAPT connectors to the handset and the telephone and snap into place.
- 4      After connecting the handset cord to the connector in the base of the telephone, turn the smooth side of the handset cord up (away from telephone base) before tucking it under the restraining tab to ensure that the telephone will sit level on the desk after installation is complete.
- 5      Connect the 6-conductor line cord to the telephone base, and route it under the tabs.
- 6      Turn the telephone right side up and place it in the normal operating position.
- 7      Designate buttons for key labels.
- 8      Insert the line cord TELADAPT connector into the connecting block and snap it into place.
- 9      Test the telephone using LD 31. See *X11 input/output guide* (553-3001-400).

**Figure 16**  
**M2000 digital telephone connections**



**Table 7**  
**M2000 trouble-locating procedures (Part 1 of 2)**

**Data communication failure**

- 1**      If voice communication is normal but data communication fails, check for dc output voltage at power supply connector pins or replace power supply plug-in transformer.  
  
Attempt to make a data call from the terminal keyboard. If not successful, proceed with step 2.
- 2**      Remove the transformer from the AC receptacle, unplug the 5-pin power supply connector at the back of the telephone, and replace the data option circuit board (see Procedure 73 and Procedure 74). Reconnect the data option power supply.  
  
Make a new attempt to start a data call. If trouble persists, continue with the ISDL C failure procedure.

**ISDL C failure**

- 1**      Check the Meridian 1 system maintenance terminal (TTY or CRT) and check for displayed error and location codes. An "NWS 401 L S C" or an "NWS 501 L S C U" code indicates that the automatic (routine) diagnostic test has detected a fault.  
  
Check for the following indications:  
  
L = faulty circuit card (ISDL C card) loop number  
  
S = circuit pack location (shelf number)  
  
C = number of the faulty circuit card  
  
U = unit number of a faulty telephone (appears only in conjunction with the NWS 501 code)
- 2**      Replace faulty components.  
  
Try to establish a call. If unsuccessful, check the telephone.

**Table 7**  
**M2000 trouble-locating procedures (Part 2 of 2)**

**Telephone (voice or dialing) failure**

- 1** Check the line cord and handset cord to determine if all TELADAPT connectors are firmly in place and reconnect the loose ones. Ensure that the polarity of the Tip and Ring leads is correct.  
  
Lift the handset and listen for the dial tone and/or dial a directory number. If unsuccessful, proceed with step 2.
- 2** Wiggle the line cord and/or handset cord while listening for sounds from the handset. If crackling or ticking sounds are heard, replace the cords.  
  
Try to establish a call. If unsuccessful, proceed with step 3.
- 3** Replace the telephone.  
  
Try to establish a call. If unsuccessful, proceed with step 4.
- 4** Check wiring between the line card, the distribution panel, and the telephone for breaks or loose connections. If necessary, rerun the wiring.  
  
Operate the telephone.

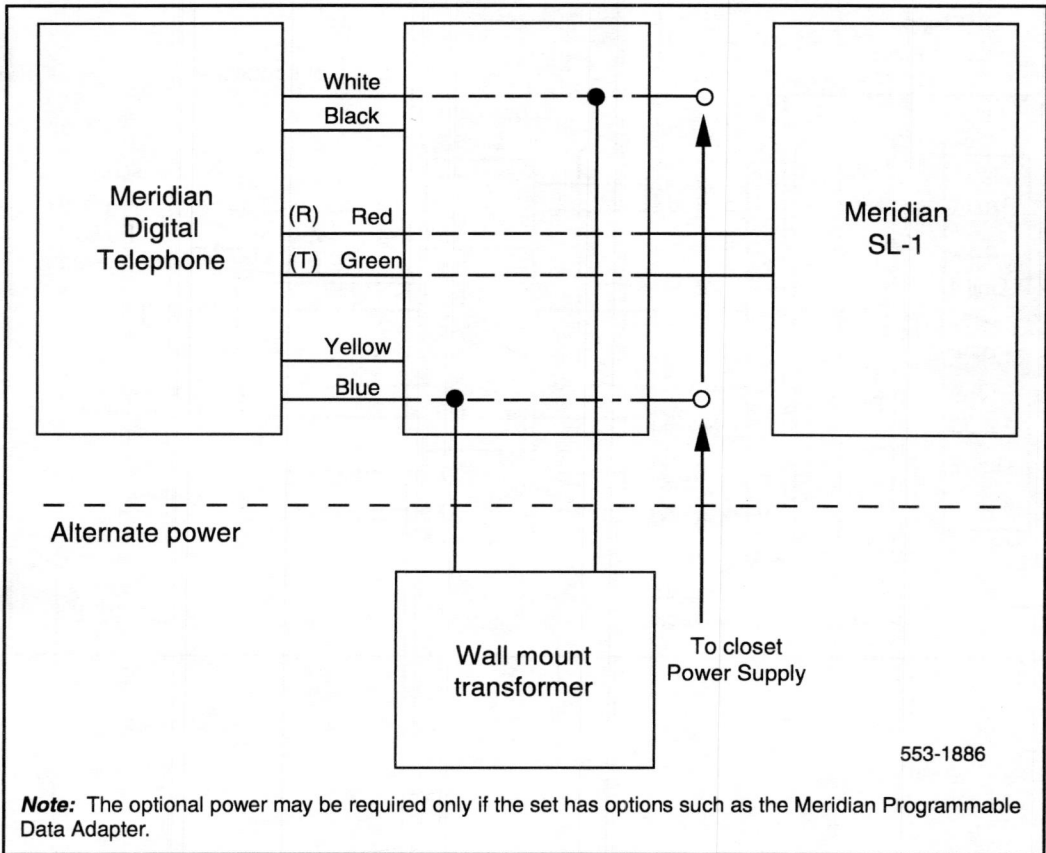
**Note:** Note: If no error codes are shown at the maintenance terminal (that is, no automatic diagnostic test was running), the Network and Signaling Diagnostic (LD 30) can be loaded and run manually from the system TTY. Refer to the *X11 input/output guide* (553-3001-400).

**Procedure 15**  
**Installing Meridian Modular Telephones**  
**(M2006/M2008/M2016S/M2616/M2216ACD)**

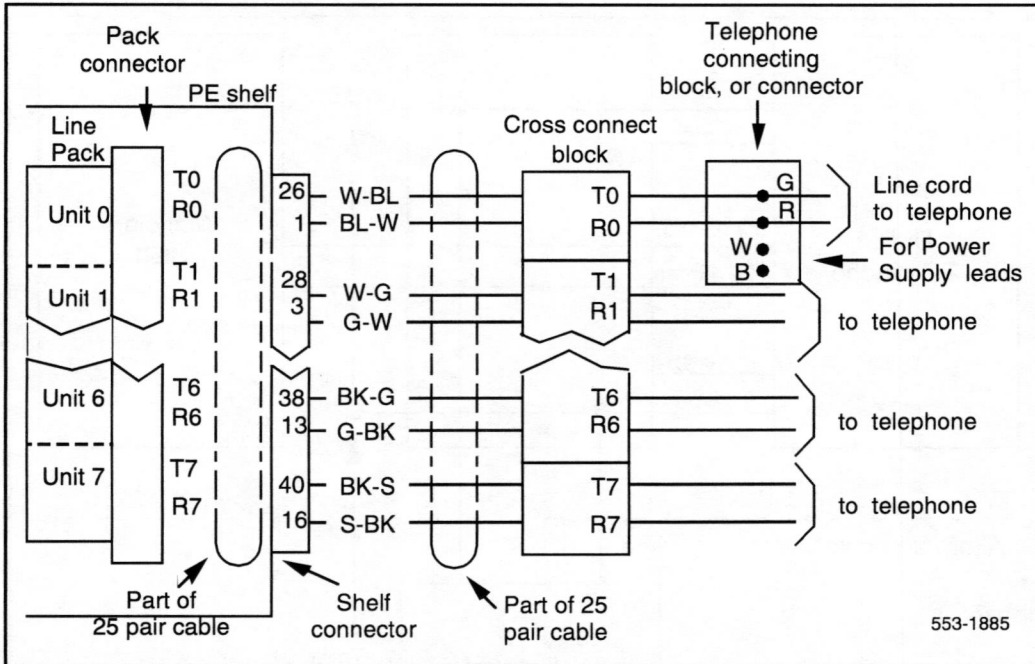
- 1**      Complete the wiring and cross-connections (loop power) before connecting the telephone to the connecting block. See Figures 17 and 18.
- 2**      Place the telephone upside down on a number of sheets of soft, clean paper on a solid, level work surface to prevent damage to movable keys and the telephone's face.
- 3**      Connect the handset cord (5-conductor TELADAPT connectors) to the handset and snap it into place (not applicable to M2216ACD).
- 4**      Connect the other end of the handset cord to the connector in the bottom cover of the telephone. Turn the smooth side of the handset cord up (away from the telephone bottom cover) before tucking it under the restraining tab to ensure that the telephone will sit level on the desk after installation is complete (not applicable to M2216ACD).
- 5**      Connect the line cord to the telephone bottom cover. Route the cord through the channels.
- 6**      Turn the telephone right side up and place it in the normal operating position.
- 7**      Print the directory number on the designation card. Using a paper clip, remove the number lens from the telephone. Insert the designation card and snap the lens back into place.
- 8**      Designate the feature keys.
- 9**      Insert the line cord TELADAPT connector into the connecting block and snap it into place.
- 10**     Perform the self-test (see Procedure 16) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400).
- 11**     Supply the user with a quick reference card and all user documentation. Make sure the SPRE number is printed on the quick reference card.



**Figure 17**  
**Meridian Modular Telephone connections**



**Figure 18**  
**Meridian Modular Telephone cross-connections**



## Meridian Modular Telephones self-test

Meridian Modular Telephones have a self-testing capability. Perform the self-test after installing a Meridian Modular Telephone or any of the hardware options to ensure proper operation.

### Procedure 16

#### Meridian Modular Telephones self-test

- 1 Unplug the line cord from the telephone.
- 2 While holding down the RLS key, plug in the line cord to the telephone. Let go of the RLS key.
- 3 Use Table 8 to perform the necessary steps and check results.

**Table 8**

**Meridian Modular Telephones self-test steps and results (Part 1 of 2)**

Step	Action	Result
1	Begin test (plug in line cord while holding down the RLS key).	Speaker beeps once, all LCDs flash. Message Waiting lamps light steadily. Display reads: LOCAL DIAGNOSTIC MODE PRESS RLS KEY TO EXIT
	The handset is on hook.	
2	Press each Function key, from zero to fifteen (if you have Key Expansion Modules, continue pressing the Function keys, in any order).	Adjacent LCD goes off when a key is pressed.
3	Press the Hold key.	Speaker beeps.
4	Press each dial pad key.	Speaker beeps each time a key is pressed.
5a	Lift the handset (if applicable).	Speaker beeps.
	Press the dial pad keys.	Handset beeps.
	Replace the handset.	

**Table 8****Meridian Modular Telephones self-test steps and results (Part 2 of 2)**

<b>Step</b>	<b>Action</b>	<b>Result</b>
<b>5b</b>	Plug in the headset (if applicable).	Speaker beeps.
	Press the dial pad keys.	Headset beeps.
	Unplug the headset.	
<b>6</b>	Press the right side of the volume control key.	Speaker beeps. Display is filled with dark squares.
	Press the right side of the volume control key.	Speaker beeps. Display is blank.
	Press the right side of volume control key.	Speaker beeps. Display shows symbols including digits 0–9 and uppercase alphabet
	Press the right side of the volume control key.	Speaker beeps. Display shows symbols including upper- and lowercase alphabet.
	Press the right side of the volume control key.	Speaker beeps. Display shows various symbols.
	Press the right side of the volume control key.	Speaker beeps. Display shows symbols.
	Press the right side of the volume control key.	Speaker beeps. Display is filled with dark squares.
<b>7</b>	Press the RLS key (end of test).	Message Waiting lamp goes off. Display shows idle screen within 10 seconds.

**Procedure 17**  
**Installing the M2317 telephone**

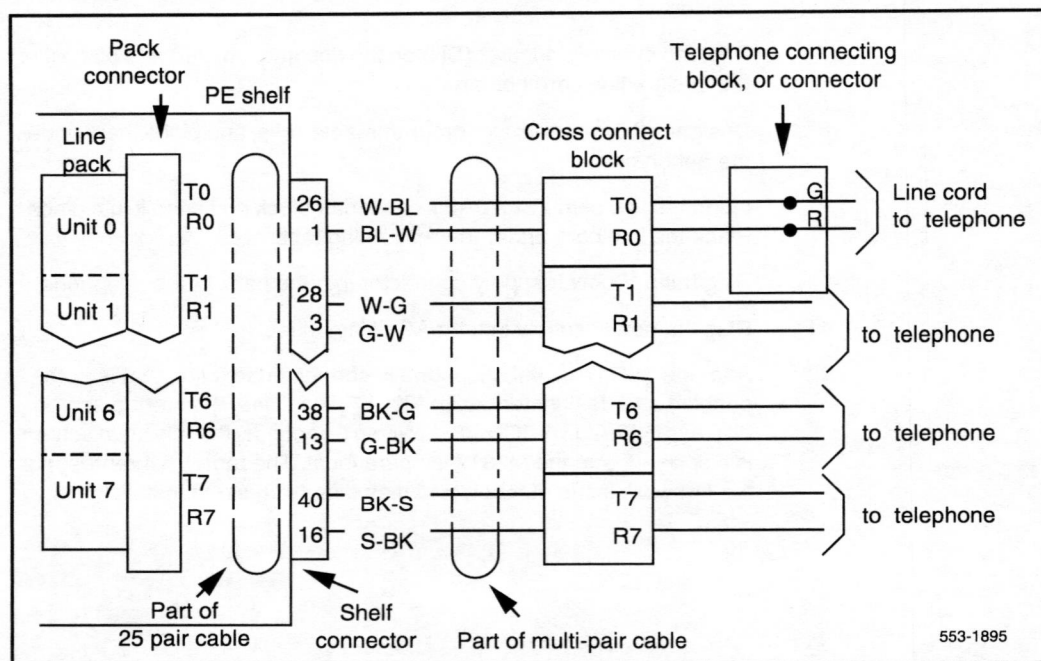
- 1** Complete the wiring and cross-connection according to Figure 19 before connecting the telephone to the TELADAPT connector block.
- 2** Place the telephone upside down on a number of sheets of soft, clean paper and on a solid, level work surface to prevent damage to movable keys and the telephone's face.
- 3** Connect the handset cord 4-conductor TELADAPT connectors to the handset and to the telephone and snap into place.
- 4** Turn the smooth side of the cord away from the telephone base and secure it under the restraining tab. This ensures that the telephone sits level after the installation is complete.
- 5** Connect the 6-conductor line cord to the telephone base, and place it under the restraining tabs.
- 6** Turn the telephone face up, and place it in the normal operating position.
- 7** Print the directory number (DN) on the designation card and place it in the designation card holder.
- 8** Designate button labels for programmable keys, and place them under the button cover.
- 9** Insert the line cord TELADAPT connector block and snap it into place. Place the line cord under the restraining tabs.
- 10** Plug the 5 V power supply connector into the back of the telephone.
- 11** Plug the power supply into an AC utility outlet.
- 12** After the M2317 digital telephone is connected to a line that is both enabled and designated as an M2317 digital line, the startup screen displays INITIALIZATION V6.4. Within 5 seconds, the Idle state screen is displayed, and the M2317 is operational. The term V6.4 represents the firmware issue number, and may differ with some installations.

- 13 If the M2317 has been connected to a line that is designated as a digital line, but is not enabled, the display will prompt **CONTACT SYSTEM ADMINISTRATOR**. The line must be enabled using LD 32 from the maintenance terminal, and by enabling the features outlined in the work order. Refer to the *X11 input/output guide* (553-3001-400) for the required routines, prompts, and responses.

If the M2317 has been connected to a line that is neither defined as a digital line nor enabled, refer to the *X11 input/output guide* (553-3001-400) for required routines, prompts, and responses.

- 14 Verify that all the requested features are enabled by accessing them with the soft keys, or programmable keys, from the M2317 telephone and observing the display screen.
- 15 Perform the self-test (see Procedure 18) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400).

**Figure 19**  
**M2317 digital telephone cross-connections**



## **M2317 telephone self-test**

The M2317 telephone has a self-testing capability. You can perform this test whether or not the telephone is connected to the Meridian 1 system. The test checks the proper functioning of the keys and liquid crystal display (LCD) indicators on the set. Follow the steps listed in Procedure 18 and Table 9 to perform the M2317 self-test.

### **Procedure 18**

#### **M2317 telephone self-test**

- 1**      Connect the telephone to the AC power supply.  
  
          The LCD screen displays "Initialization ... vX.X" (note that you have only 3 to 5 seconds to begin step 2).
- 2**      Press softkey 5 twice, then press softkey 4 twice.
- 3**      Use Table 9 to perform the necessary steps and check results.
- 4**      Unplug the power supply to end the test.



**Table 9**  
**M2317 telephone key/LCD indicator self-tests**

[illegible]

When the M2317 digital telephone or the data option fails to function properly, follow the steps listed in Table 10 in sequence to isolate the problem area.

**Table 10**  
**M2317 trouble-locating procedures (Part 1 of 2)**

**Loop power failure**

- 1 Plug in the telephone.
- 2 The LCDs flash once to indicate the power is OK.

**Data communication failure**

- 1 If voice communication is normal but data communication fails, check for DC output voltage at the power supply connector pins or replace the power supply plug-in transformer.  
  
Attempt to make a data call from the terminal keyboard (refer to *Meridian 1 telephones description and specifications* (553-3001-108)). If not successful, proceed with step 2.
- 2 Make a call to the DN (voice or data) to verify that the port is enabled.
- 3 Use an EIA or RS-232 breakout box in conjunction with the terminal cable to verify lead states and replace or repair cable if pinouts are incorrect.  
  
Attempt to make a data call from the terminal keyboard (refer to *Meridian 1 telephones description and specifications* (553-3001-108)). If still not successful, proceed with step 4.
- 4 Remove the transformer from the AC receptacle, unplug the 5-pin power supply connector at the back of the telephone, and replace the data option circuit board (see Procedure 74). Reconnect the data option power supply.  
  
Make a new attempt to start a data call. If trouble persists, continue with the ISDLCD failure procedure.
- 5 Use the self-test procedure to verify that the telephone electronics are operating correctly.

**Table 10**  
**M2317 trouble-locating procedures (Part 2 of 2)**

**ISDLIC failure**

- 1**      Go to the system maintenance terminal (TTY or CRT) and check for displayed error and location codes. An "NWS 401 L S C" or an "NWS 501 L S C U" code indicates that the automatic (routine) diagnostic test has detected a fault.

Check for the following indications:

L = faulty circuit card (ISDLIC card) loop number

S = circuit card location (shelf number)

C = number of the faulty circuit card

U = unit number of a faulty telephone (appears only in conjunction with the NWS 501 code)

- 2**      Replace the faulty components.

Try to establish a call. If unsuccessful, check the telephone.

**Telephone (voice or dialing) failure**

- 1**      Check the line cord and handset cord to determine if all TELADAPT connectors are firmly in place and reconnect the loose ones. Ensure that the polarity of the Tip and Ring leads is correct.

Lift the handset and listen for the dial tone and/or dial a directory number. If unsuccessful, proceed with step 2.

- 2**      Wiggle the line cord and/or handset cord while listening for sounds from the handset. If crackling or ticking sounds are heard, replace the cords.

Try to establish a call. If unsuccessful, proceed with step 3.

- 3**      Replace the telephone.

Try to establish a call. If unsuccessful, proceed with step 4.

- 4**      Check the wiring between the line card, distribution panel, and telephone for breaks or loose connections. If necessary, rerun the wiring.

Operate the telephone.

**Note:** If no error codes are shown at the maintenance terminal, the Network and Signaling Diagnostic (LD 30) can be loaded and run manually from the system TTY. Refer to the *X11 input/output guide* (553-3001-400).

**Procedure 19****Installing the M3000 Touchphone set**

- 1 Place the Touchphone set upside down on a number of sheets of soft, clean paper on a solid, level work surface to prevent damage to movable keys and the telephone's face.

**Installing Asynchronous Data Option (ADO)**

- 2 Remove the four self-tapping screws that fasten the stand to the Touchphone body. Lift the stand off the locating posts in a straight, upward motion.
- 3 Snap the ADO into the rear of the Touchphone body, with the ribbon cable and header connector protruding from the front of the ADO housing.
- 4 Plug the 34-pin header connector at the end of the ribbon cable into the receptacle located in the body of the Touchphone set and press firmly.

**Assemble the Touchphone set and Stand**

- 5 Place the stand over the Touchphone body and position over the four locating posts.
- 6 Using the four self-tapping screws removed earlier, fasten the stand securely to the Touchphone body.

**Connect the Cords**

- 7 If the handset is not already connected to the Touchphone set, connect the cord's TELADAPT connector to the Touchphone body. Route the cord under the plastic tabs in the stand and out the exit slot. Snap the other end of the cord into the handset receptacle.
- 8 Connect the line cord TELADAPT connector to the Touchphone body jack, and route the cord through the channel in the stand. Connect the other end of the line cord to the baseboard or wall connector.
- 9 Plug the power transformer cord into the mating connector in the Touchphone body and press firmly.

- 10    Route the power cord through its channel in the stand. Plug the transformer into an AC wall outlet. The Touchphone display screen will show STARTING UP and will prompt the user to PLEASE WAIT.

**Note 1:** The characters displayed between the prompt PLEASE WAIT and the string of five numbers at the bottom of the display are special codes used for service routines only. Unless this is an initial installation, ignore them.

**Note 2:** If installing the telephone for the first time, enter the initialization code. This clears the directory and prepares the telephone for installation.

#### **Initialization**

- 11    If the Touchphone set being installed is connected to a line that is defined as an M3000 Touchphone line, and is enabled, the STARTING UP screen display will automatically change to the IDLE screen display within 10 seconds.

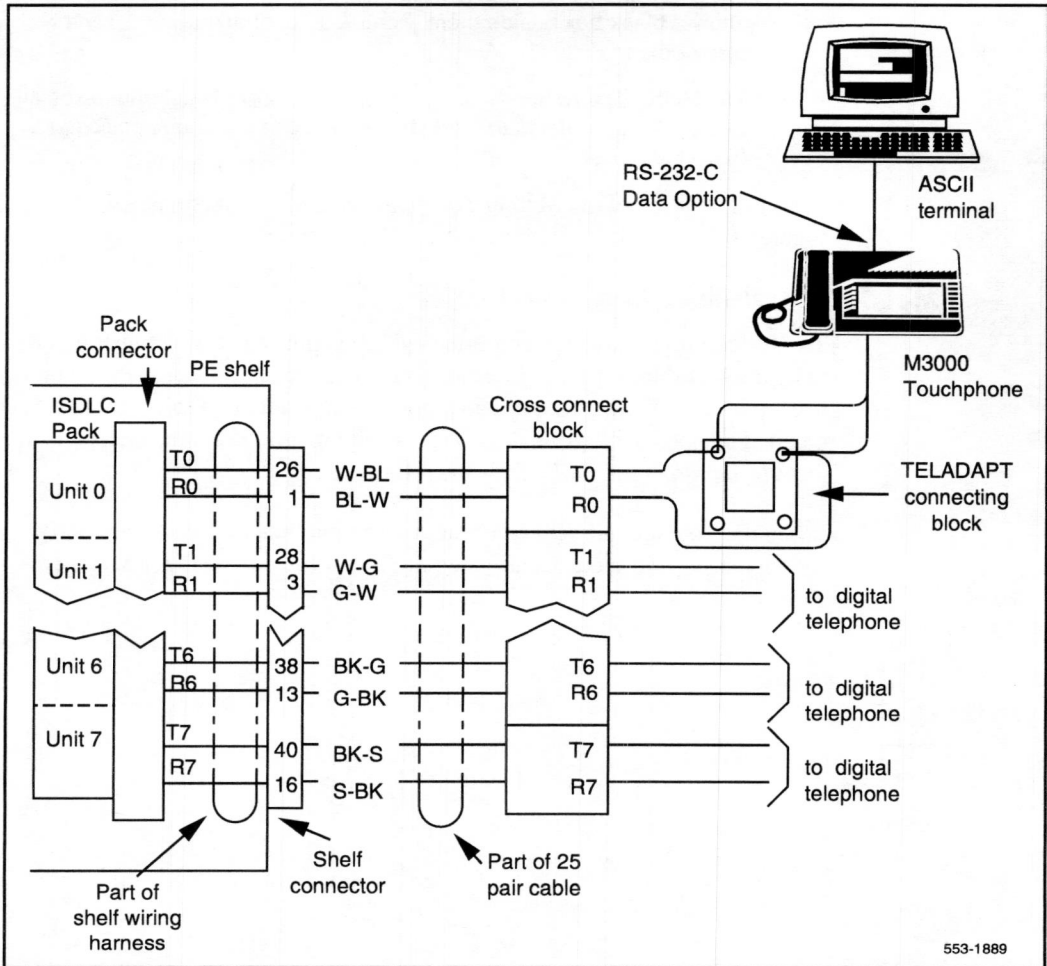
If the prompt STARTING UP ... PLEASE WAIT remains on the screen longer than 15 seconds, the Touchphone set being installed is connected to a line defined as an M3000 line, but the line is not enabled. The line must be enabled using LD 32 from the maintenance terminal, and by enabling the features outlined in the work order. Refer to the *X11 input/output guide* (553-3001-400) for the required routines, prompts, and responses.

If the Touchphone set being installed is connected to a line that is neither defined as an M3000 line nor enabled, refer to LD 11 in the *X11 input/output guide* (553-3001-400). Refer to step 12 for feature verification.

- 12    If the Touchphone set to be installed has arrived directly from the factory, or if it has come from another location with a stored internal directory that is unrelated to the new location, touch positions 1 3 3 2 (in that sequence) in the number string at the bottom of the STARTING UP screen display prior to loading data and features.

**Note:** If digits 1, 3, 3, and 2 are operated on the STARTING UP screen, the internal memory store of that Touchphone will be wiped clean.

**Figure 20**  
**M3000 Touchphone cross-connections**



- 13**    Verify that all features requested in the work order are enabled by touching TOUCH PROFILE on the IDLE screen, then LIST FEATURES on the TOUCH PROFILE screen. Enabled features will show a black box beside them. Features not enabled will show a blank box.

The M3000 is now operational. Should the M3000 Touchphone set fail to operate, see *Meridian 1 telephones description and specifications* (553-3001-108).

For an illustration of the M3000 Touchphone cross-connections, see Figure 20.

### **M3000 trouble locating**

Trouble conditions are either reported by the telephone user (customer report) or by the Meridian 1 trouble-indicating system by means of automatic routine tests. For recommended trouble-locating routines refer to Table 11. For detailed diagnostic program descriptions and input/output reference, consult the *X11 input/output guide* (553-3001-400).

When the Touchphone set and/or the data option fails to function properly, follow the steps in sequence as listed in Table 11 to isolate the problem area.



**Table 11**  
**M3000 trouble-locating procedures (Part 1 of 2)**

**Data communication failure**

- 1** If the Touchphone screen shows the prompt CHECK TERMINAL AND TRY AGAIN, check for a disconnected RS-232 plug or a power failure at the DTE or the computer terminal and take corrective action.

The Touchphone screen should change to the Data Call Initiation state. See *Meridian 1 telephones description and specifications* (553-3001-108). Attempt to make a data call from the terminal keyboard. If unsuccessful, check subsequent steps.
- 2** If the Touchphone screen shows the prompt REPORT DATA CHANNEL PROBLEM, check out the following:

  - (a) Check if the data TN has been disabled in LD 32, or if the system disabled it due to excessive errors. If so, reenable the data TN in LD 32.
  - (b) If the station was recently relocated, the data TN may not have been redefined (set relocation does not automatically move the voice and data TNs together). Check LD 20 to see if the data TN is defined. If not, use Overlay 11 to make the data TN and voice TN conform (note that the data TN must be 8 units higher than the voice TN, with the same loop, shelf, and card number).
  - (c) The data option is defective or disconnected from the Touchphone circuit board, or switch 5 on the SL-1 system QPC464 peripheral buffer card is not set for quad density. Check switch 5 on the QPC464 first, and if that is set correctly, check if the ribbon cable connector from the data option is plugged into the Touchphone set securely (the Touchphone stand must be removed to check the ribbon cable).

Attempt to make a data call from the terminal keyboard. Refer to *Meridian 1 telephones description and specifications* (553-3001-108). If not successful, proceed with step 3.
- 3** Replace the data option (see Procedures 73 and 74).

Make a new attempt to start a data call. If trouble persists, continue with "ISDLN failure."

**Table 11**  
**M3000 trouble-locating procedures (Part 2 of 2)**

**ISDL C failure**

- 1** Check the system maintenance terminal (TTY or CRT) for displayed error and location codes. An "NWS 401 L S C" or an "NWS 501 L S C U" code indicates that the automatic (routine) diagnostic test has detected a fault. Check for the following indications:

L = faulty circuit pack (ISDL C card) loop number

S = shelf number where circuit card is located

C = the number of the faulty circuit card

U = the unit number of a faulty telephone (appears only in conjunction with the NWS 501 code)

- 2** Replace the faulty components (for replacement procedures refer to *Circuit card installation and testing* (553-3001-211)).

Try to establish a call. If unsuccessful, proceed to check the Touchphone set.

**Touchphone (voice or dialing) failure**

- 1** Check the line cord and handset cord to determine if all TELADAPT connectors are firmly in place and reconnect them where loose.

Lift the handset and listen for the dial tone and/or dial a directory number. If unsuccessful, proceed with step 3.

- 2** Verify that the port is enabled.

- 3** Wiggle the line cord and/or handset cord while listening for sounds from the handset. If crackling or ticking sounds are heard, replace the cords.

Try to establish a call. If unsuccessful, proceed with step 4.

- 4** Replace the Touchphone set.

Try to establish a call. If unsuccessful, proceed with step 5.

- 5** Check wiring between the line card, distribution panel, and telephone for breaks or loose connections. If necessary, rerun the wiring.

Operate the Touchphone set.

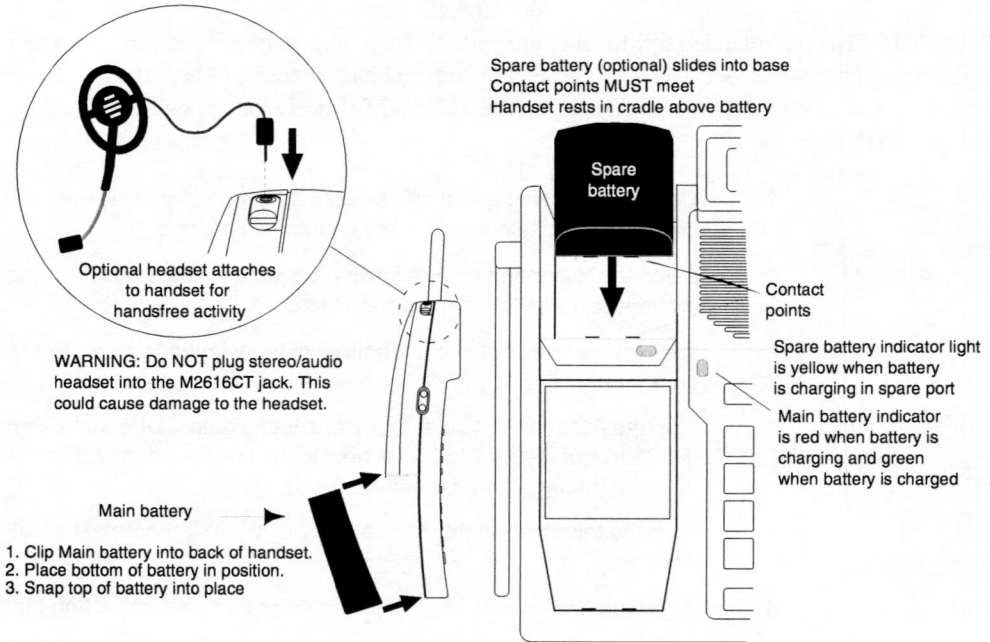
**Note:** If no error codes are shown at the maintenance terminal (that is, no automatic diagnostic test was running), the Network and Signaling Diagnostic (LD 30) can be loaded and run manually from the Meridian 1 system TTY by keying in "LD 30" and the suspected loop number. Refer to the *X11 input/output guide* (553-3001-400).

**Procedure 20**  
**M2616CT Installation****WARNING**

The M2616CT is not intended for direct connection to the public switched network or other exposed plant networks, because the exposed pins on the handset cradle (where the handset sits) creates a possible outlet for harmful voltage. The M2616CT is designed to be used with a Meridian PBX.

- 1 Complete the wiring and cross-connections (loop power) before connecting the telephone to the connection block.
- 2 Place the telephone upside down on a padded level work surface to prevent damage to the telephone face.
- 3 connect the line cord into the bottom of the telephone base. Route the cord through the channels.
- 4 Plug the AC adapter (Class 2 power supply) output DIN connector into the bottom of the M2616CT set next to the line cord connection. Route the cord through the channels.
- 5 Turn the telephone right side up and place it in the normal operating position.
- 6 Insert the line cord TELEDAPT connector into the connecting block.
- 7 Plug the AC adapter (Class 2 power supply) input into the commercial 11V electrical main outlet.
- 8 Print the directory number on the designation card. Using a paper clip remove the number lens from the telephone. Insert the designation card and snap the lens back into place
- 9 Designate the feature keys.

## Procedure 21 M2616CT Installing the battery



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- 1 Place the handset battery in the base of the handset so the battery engages with the contact points.
- 2 Snap the battery into place.
- 3 Slide the spare battery (optional purchase) into the spare battery compartment, located at the top of the handset cradle. The yellow indicator lights when the battery is properly connected.

The battery begins to charge as soon as the handset is placed in its cradle. The main handset battery 700 mAh fully recharges in approximately 2.25 hours, the 1000 mAh battery charges in approximately 2.50. It should be noted that the that the spare battery charging port on the base unit provides a "trickle charge" that charges the battery at a slower rate than through the handset.

**Procedure 22**  
**M2616CT Wall mounting**

The M2616CT base is equipped with a reversible footstand that allows you to mount the telephone on the wall. The procedure is described below:

- 1 Remove the handset and place the telephone upside down on a level work surface covered with soft material to prevent damage to movable keys and the telephone face.
- 2 Disconnect all cords from the set.
- 3 Remove the two screws from the footstand assembly.
- 4 Unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base, and pulling upward.
- 5 Rotate the footstand 180 degrees and screw the footstand back into place to the set's bottom cover.
- 6 Tighten all screws and replace all cords.
- 7 Mount the telephone on the wall using the wall-mount holes provided on the bottom of the footstand.

**Procedure 23**  
**M2616CT Meridian 1 system administration**

To configure the M2616CT set refer to X11 Software input/output guide (553-3001-400) for complete information and procedures on LD11 to configure the Meridian Digital Telephone. For the Locator key (key 14) to function, do not assign a feature to this key. Handsfree is required for the M2616CT to function properly.

**Procedure 24**  
**M2616CT Handset Registration to Base Unit**

Each M2616CT handset is automatically registered to its respective base unit. In cases where a substitute handset is required for troubleshooting purposes, a different M2616CT handset can be reregistered by placing the handset on-hook, and unplugging, then re-plugging in the AC power adapter and telephone line cord.

**Procedure 25****M2616CT Manual RF (Radio Frequency selection)**

The M2616CT uses 900 MHz narrowband signaling. Other products also use these channels. Due to interference from other products, there may be a time when the installer must confirm the user's M2616CT so that other 900 MHz products will not cause interference. A function available on Key 14 in addition to the Locator feature is the Manual RF Selection feature. Use the following steps to use the Manual RF Selection feature:

- 1      Add a feature (any feature) on the Meridian 1 Key 14.
- 2      Press Key 14 and AUTO appears on the display.
- 3      Toggle the volume key until you receive the desired channel (CH00 through CH19)
- 4      Press Key 14 again.
- 5      Remove the feature from Key 14 to have access to the Locator feature. By selecting one channel instead of scanning, you will have quicker response to the voice channel and be able to clear the interference in your area.

**Table 12**  
**Frequency Ranges**

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
CH00	902.6	CH05	910.6	CH10	915.8	CH15	921.4
CH01	904.0	CH06	912.0	CH11	916.4	CH16	923.0
CH02	905.6	CH07	914.2	CH12	918.4	CH17	924.8
CH03	907.2	CH08	914.8	CH13	919.6	CH18	926.4
CH04	908.8	CH09	915.2	CH14	921.4	CH19	927.6

## **M3900 Series Meridian Digital Telephone**

The M3900 Series Meridian Digital Telephones provide versatile functionality to the desktop environment. The M3900 Series Meridian Digital Telephones have five models:

- M3901 entry level telephone
- M3902 Basic Telephone
- M3903 Enhanced Telephone
- M3904 Professional Telephone
- M3905 Call Center Telephone

For more information on the M3900 Series Meridian Digital Telephone refer to the *M3900 Series Meridian Digital Telephone* (553-3001-216) document.



## Designating telephones

Before designating telephones, check the work order for features enabled and key designations. Designate each key by placing its feature name (from the designation sheet) in the key cap that fits on the key.

### **Procedure 26**

#### **Designating 500-type telephones**

- 1        Remove the finger wheel and number card from its envelope.
- 2        Designate the number card with the appropriate directory number and station designator.
- 3        Insert the number card into the finger wheel (making sure the number card is properly oriented).
- 4        Place the telephone on a flat surface.
- 5        Place the finger wheel over the clamp on the dial, with the "0" hole directly over the digit "9," making sure the finger wheel depressions are properly positioned on the prongs of the clamp plate.
- 6        Rotate the finger wheel counterclockwise until the clamp spring snaps into the notch on the underside of the finger wheel.

### **Procedure 27**

#### **Removing the finger wheel from 500-type telephones**

- 1        Place the telephone on a flat surface.
- 2        Rotate the finger wheel clockwise as far as possible.
- 3        Insert a paper clip into the small hole between the digits "9" and "0" located on the edge of the grooved section of the finger wheel.
- 4        Press down on the releaser to disengage the finger wheel clamp spring.
- 5        Rotate the finger wheel further clockwise until the clamp spring releases.
- 6        Remove the finger wheel when it becomes loose. The dial returns to normal position.

**Procedure 28**

**Designating 2500-type telephones**

- 1 The designation window is located directly below the dial pad. Insert a paper clip into the hole at the left or right end of the designation window.
- 2 Gently pry the window toward the center and remove.
- 3 Insert number tag with the appropriate directory number and station designator, and replace the designation window.

**Procedure 29**

**Designating SL-1, digital, and Meridian Modular Telephones**

- 1 Remove the cap from each key requiring a designation.
- 2 Place the designation in the cap, place the cap over the corresponding key, and gently press down. Repeat for all keys requiring designations.
- 3 Insert a paper clip into the hole at the left or right end of the designation window.
- 4 Gently pry the window toward the center and remove, and insert the number tag.
- 5 Replace the designation window.

## Connecting telephones

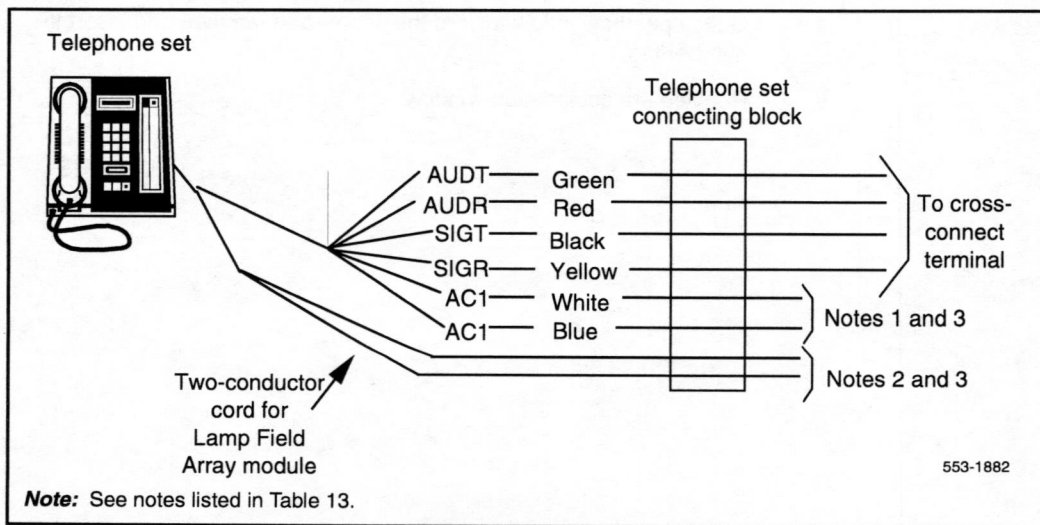
Procedure 30 describes how to connect SL-1 and M1109 Compact telephones.

Figure 21 illustrates and Table 13 lists the SL-1 and M1109 telephone connections.

### Procedure 30 Connecting SL-1 and M1109 telephones

- 1     Ensure that the terminal connector is compatible with the telephone connector.
- 2     Connect the set cord to the terminal connecting block, or couple the Amphenol or the TELADAPT connector (if provided).
- 3     Secure the cover of the connector (if provided).

**Figure 21**  
**SL-1 and M1109 telephone connections**



**Table 13**  
**SL-1 and M1109 telephone connections**

Mounting Cord		Connecting block designations			Inside wiring colors	
Lead name	Color	NE-47QA or QBB1B	NE-283 74-5001 Adapter	NE-625F TELADAPT	Z station wire	16/25-pair cable
Audio T	G	G	1T	T1 (G)	G	W-BL
Audio R	R	R	1R	R1 (R)	R	BL-W
SIG T	BK	BK	X1	AUX (BK)	BK	W-O
SIG R	Y	Y	X2	GND (Y)	Y	O-W
AC1	BL	5	R	T2 (BL)		W-SL
AC1	W	6	B	R2 (W)		SL-W
<b>Note 1:</b> To prevent sending false signals to the CPU, connect and disconnect leads in the following sequence:						
<b>Connecting</b>		<b>Disconnecting</b>				
1. Signal pair (SIGT, SIGR)		1. Power pair				
2. Audio pair (AUDT, AUDR)		2. Audio pair				
3. Power pair (AC1, AC1)		3. Signal pair				
<b>Note 2:</b> A 24 V ac supply is required when the telephone is equipped with a digit display, such as QUS1C logic Handsfree unit, a QKK-type remote powering kit (for extended range), or QMT1 or QMT2 key/lamp modules.						
<b>Note 3:</b> 15 V ac supply required when equipped with a QMT3 Lamp Field Array module. An extra 3-conductor cord kit is required.						
<b>Note 4:</b> The 115/24 V ac or 115/15 V ac transformers must be located within 25 ft (7.7 m) of the telephone (each requires a separate transformer). With the QUT1 or QUAA1 centralized power unit, each telephone requires a separate fuse to prevent noise or cross talk.						

Procedure 31 describes how to connect 500- and 2500-type telephones.

Table 14 lists the NE-500/2500 telephone connections.

### **Procedure 31**

#### **Connecting 500/2500-type telephones**

- 1**      Ensure that the terminal connector is compatible with the telephone connector.
- 2**      Connect the telephone mounting cord.  
  
TELADAPT cords (NE-625F connector) do not require terminations. Insert the plastic connector on the end of the telephone mounting cord into the NE-625F-type receptacle.
- 3**      Connect the mounting cord to an NE-284-74-5001 Amphenol adapter if reusing a 16- or 25-pair cable. Plug the adapter into the cable connector. Fasten the connector together with the screws provided at the end of each connector.

**Table 14**

**NE-500/2500 telephone connections**

<b>Mounting cord</b>	<b>NE-47QA or QBBIB block designation</b>	<b>NE-284-74-5001 designation</b>	<b>Cable color pairs (16 to 25 not used)</b>	<b>Connect to TN</b>
TIP (green)	G	1T	W-BL	TIP
RING (red)	R	1R	BL-W	RING
GND (yellow)	BK	X2		
	Y	X1		

## Cross-connecting telephones

Be sure to connect the telephones according to Figures 22, 23, and 24. Figure 22 provides the diagram for cross-connecting 500/2500-type telephones on a peripheral equipment (PE) module. Tables 15, 16, and 17 show 500/2500 telephone cross-connections on an intelligent peripheral equipment (IPE) module.

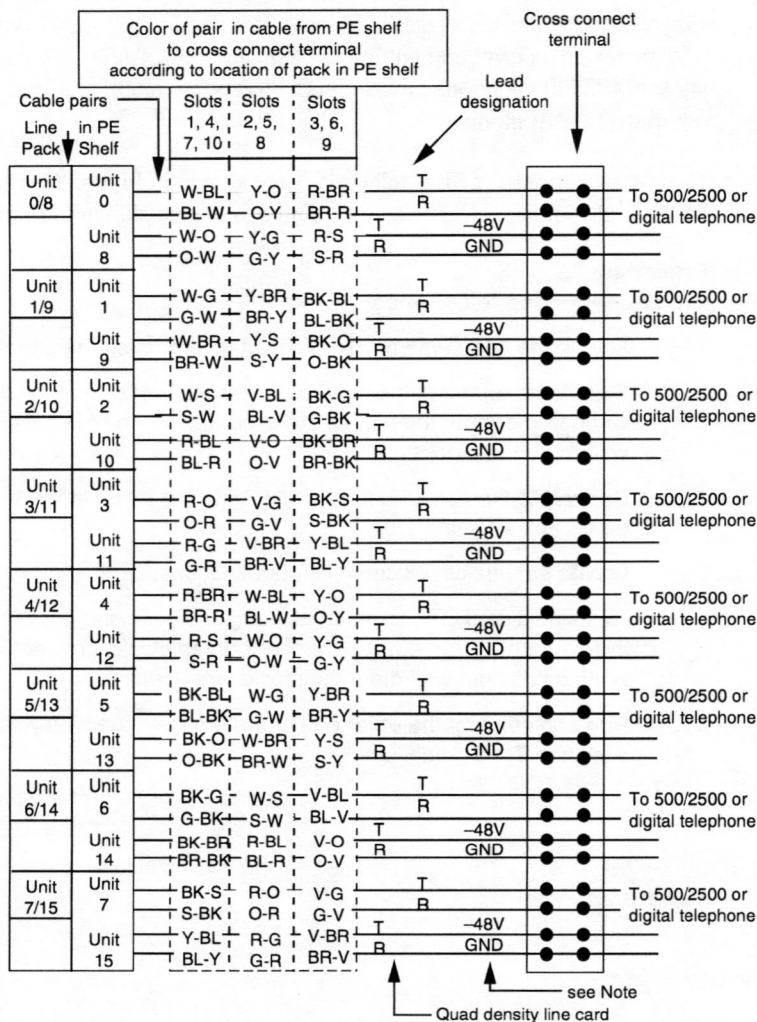
Cross-connections for SL-1 telephones are shown in Figure 23, and the Meridian Modular Telephone cross-connections are shown in Figure 24.

### Procedure 32

#### Cross-connecting telephones

- 1      Locate the telephone terminations at the cross-connect terminal.  
  
Telephone terminations are located on the vertical side of the frame when frame-mounted blocks are used and in the blue field when wall-mounted blocks are used.
- 2      Connect Z-type cross-connecting wire to the leads of the telephone (see Tables 18 and 19).
- 3      Locate the line circuit card (TN) terminations.  
  
Line circuit card (TN) terminations are located on the horizontal side of the distributing frame when frame-mounted blocks are used and in the white field when wall-mounted blocks are used.
- 4      Run and connect the other end of the cross-connecting wire to the assigned TN terminal block.

**Figure 22**  
**NE-500/2500-type telephone cross-connections for PE modules**



**Note:** This connection applies only to line cards equipped with the Parallel Message Waiting Lamp feature. This connects to a second message waiting indication, a lamp bank for example. The maximum loop resistance is 2000Ω.

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**Table 15**  
**500/2500 line card pair-terminations for IPE module connectors A, E, K, R**

Pair	Pins	Pair color	I/O panel connectors				Unit
			A	E	K	R	16/card
1T/1R	26/1	W-BL/BL-W	slot 0	slot 4	slot 8	slot 12	0
2T/2R	27/2	W-O/O-W					1
3T/3R	28/3	W-G/G-W					2
4T/4R	29/4	W-BR/BR-W					3
5T/5R	30/5	W-S/S-W					4
6T/6R	31/6	R-BL/BL-R					5
7T/7R	32/7	R-O/O-R					6
8T/8R	33/8	R-G/G-R					7
9T/9R	34/9	R-BR/BR-R					8
10T/10R	35/10	R-S/S-R					9
11T/11R	36/11	BK-BL/BL-BK					10
12T/12R	37/12	BK-O/O-BK					11
13T/13R	38/13	BK-G/G-BK					12
14T/14R	39/14	BK-BR/BR-BK					13
15T/15R	40/15	BK-S/S-BK					14
16T/16R	41/16	Y-BL/BL-Y					15

**Table 16**  
**500/2500 line card pair-terminations for IPE module connectors B, F, L, S**

Pair	Pins	Pair color	I/O panel connectors				Unit
			B	F	L	S	16/card
1T/1R	26/1	W-BL/BL-W	slot 1	slot 5	slot 9	slot 13	0
2T/2R	27/2	W-O/O-W					1
3T/3R	28/3	W-G/G-W					2
4T/4R	29/4	W-BR/BR-W					3
5T/5R	30/5	W-S/S-W					4
6T/6R	31/6	R-BL/BL-R					5
7T/7R	32/7	R-O/O-R					6
8T/8R	33/8	R-G/G-R					7
9T/9R	34/9	R-BR/BR-R					8
10T/10R	35/10	R-S/S-R					9
11T/11R	36/11	BK-BL/BL-BK					10
12T/12R	37/12	BK-O/O-BK					11
13T/13R	38/13	BK-G/G-BK					12
14T/14R	39/14	BK-BR/BR-BK					13
15T/15R	40/15	BK-S/S-BK					14
16T/16R	41/16	Y-BL/BL-Y					15
17T/17R	42/17	Y-O/O-Y	slot 2	slot 6	slot 10	slot 14	0
18T/18R	43/18	Y-G/G-Y					1
19T/19R	44/19	Y-BR/BR-Y					2
20T/20R	45/20	Y-S/S-Y					3
21T/21R	46/21	V-BL/BL-V					4
22T/22R	47/22	V-O/O-V					5
23T/23R	48/23	V-G/G-V					6
24T/24R	49/24	V-BR/BR-V					7
25T/25R	50/25	V-S/S-V					Spare

**Table 17**  
**500/2500 line card pair-terminations for IPE module connectors C, G, M, T**

Pair	Pins	Pair color	I/O panel connectors				Unit
			C	G	M	T	16/card
1T/1R	26/1	W-BL/BL-W	slot 2	slot 6	slot 10	slot 14	8
2T/2R	27/2	W-O/O-W					9
3T/3R	28/3	W-G/G-W					10
4T/4R	29/4	W-BR/BR-W					11
5T/5R	30/5	W-S/S-W					12
6T/6R	31/6	R-BL/BL-R					13
7T/7R	32/7	R-O/O-R					14
8T/8R	33/8	R-G/G-R					15
9T/9R	34/9	R-BR/BR-R	slot 2	slot 6	slot 11	slot 15	0
10T/10R	35/10	R-S/S-R					1
11T/11R	36/11	BK-BL/BL-BK					2
12T/12R	37/12	BK-O/O-BK					3
13T/13R	38/13	BK-G/G-BK					4
14T/14R	39/14	BK-BR/BR-BK					5
15T/15R	40/15	BK-S/S-BK					6
16T/16R	41/16	Y-BL/BL-Y					7
17T/17R	42/17	Y-O/O-Y					8
18T/18R	43/18	Y-G/G-Y					9
19T/19R	44/19	Y-BR/BR-Y					10
20T/20R	45/20	Y-S/S-Y					11
21T/21R	46/21	V-BL/BL-V					12
22T/22R	47/22	V-O/O-V					13
23T/23R	48/23	V-G/G-V					14
24T/24R	49/24	V-BR/BR-V					15
25T/25R	50/25	V-S/S-V					Spare

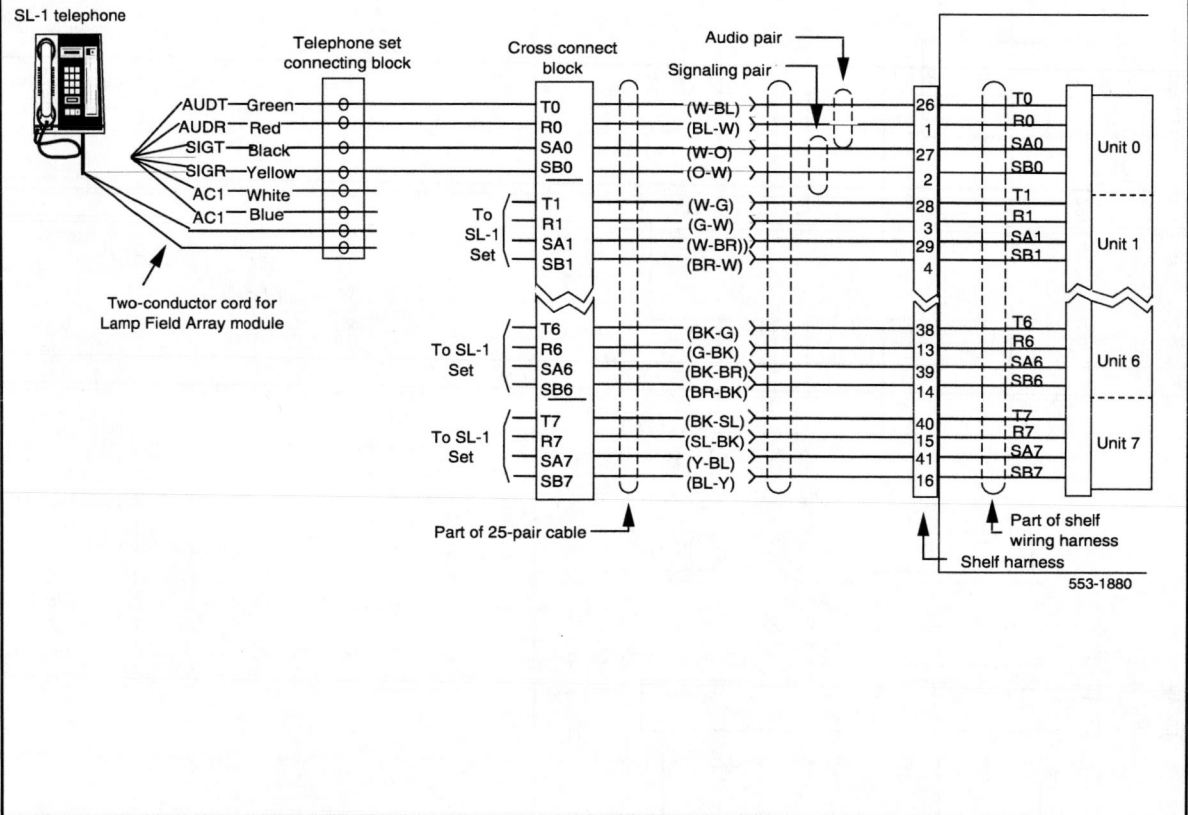
**Table 18**  
**Z-type cross-connecting wire**

Size	Gauge	Color	Designation
1 pr	22	Y-BL	Tip
		BL-Y	Ring
3 pr	24	W-BL	Voice T
		BL-W	Voice R
		W-O	Signal T
		O-W	Signal R
		W-G	Power
		G-W	Power

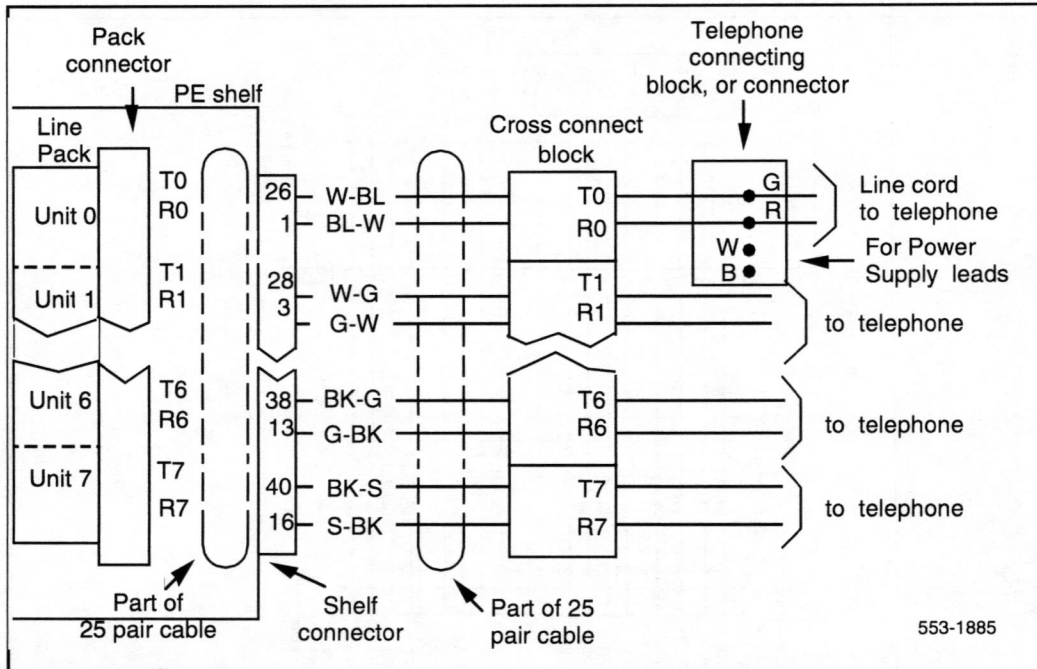
**Table 19**  
**Inside wiring colors**

Inside wiring colors		Connect to equipment TN
Z station wire	16/25-pair cable	
G	W-BL	First pair Tip
R	BL-W	First pair Ring
BK	W-O	Second pair Tip
Y	O-W	Second pair Ring

**Figure 23**  
**SL-1 telephone cross-connections**



**Figure 24**  
**Meridian Modular Telephone cross-connections**



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## Add-on modules

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### Packing and unpacking

Use proper care while unpacking any add-on module. Check for damaged containers so that appropriate claims can be made to the transport company for items damaged in transit.

If a module must be returned to the factory, pack it in the appropriate container to avoid damage during transit. Remember to include all loose parts in the shipment.

**Note:** There are three distinct versions of Modular telephone sets—all three are supported. The versions can be clearly distinguished by the first four letters in the upper left-hand corner of the model identification label on the bottom of the set. The three types are the “NTZK” models and the “NT2K” models with date code prior to January 1998 and the NT2K with date code of January 1998. In addition, the two jacks face in the same direction on NT2K and NT9K sets, and in opposite directions on NTZK sets. When appropriate, differences between the models are noted in this document.

### QMT1 and QMT2 add-on modules

The QMT1 key/lamp module has 10 nonlocking keys and 8 LEDs, while the QMT2 key/lamp module has 20 nonlocking keys and 16 LEDs. Add modules to the right side of an SL-1 telephone or attendant console.



The SL-1 telephone can have up to six additional key strips (for example, six QMT1 modules, or two QMT1 and two QMT2 modules). However, the number of additional key strips that you can add may be limited by other equipment that is connected to the telephone. A full description of equipment that can be added to an SL-1 telephone, along with their limitations, is described in *Meridian 1 telephones description and specifications* (553-3001-108).

The QCW-type attendant console accommodates one QMT2 or two QMT1 modules.

When the M1250 or M2250 attendant console is delivered from the factory, the QMT2 option switch is OFF. To turn the switch ON, you must open the attendant console (see Procedure 6).

Each telephone that has a key/lamp module installed requires a 25 V ac power supply.

Procedures 33, 34, 35, and 36 describe how to connect and disconnect add-on key modules. Tables 20 through 23 give switch settings for the various applications of add-on modules. Table 24 gives the jack numbering for add-on module connecting.

## Faceplate

See Figure 25 as a reference for the removal and installation of the QMT1 and QMT2 add-on module faceplate.

### Procedure 33

#### Installing the QMT1 and QMT2 add-on module faceplate

- 1     Place the add-on module on a desk with the front edge slightly beyond the edge of the desk.
- 2     Fit the cover to the housing and tighten the captive retaining screws.
- 3     Position the faceplate so that the keys will pass through the cutouts in the faceplate.
- 4     Tilt the back edge of the faceplate toward the rear of the module, and insert the locating tabs into the slots on the attendant console cover.
- 5     Keeping the locating tabs in the slots, tilt the front edge of the faceplate down, passing the keys through the cutouts in the faceplate.

- 6 Press the front edge of the faceplate down until the faceplate catches snap into place.
- 7 Ensure that the faceplate is securely held in place without binding the keys.

**Procedure 34**

**Removing the QMT1 and QMT2 add-on module faceplate**

- 1      Place the add-on module on a desk with the front edge slightly beyond the edge of the desk.
- 2      Insert a paper clip into each release hole in the front edge of the module housing to release the faceplate (see Figure 25).
- 3      Lift the faceplate off.
- 4      Unscrew the captive retaining screws securing the cover to the housing, and remove the cover.

**Procedure 35**

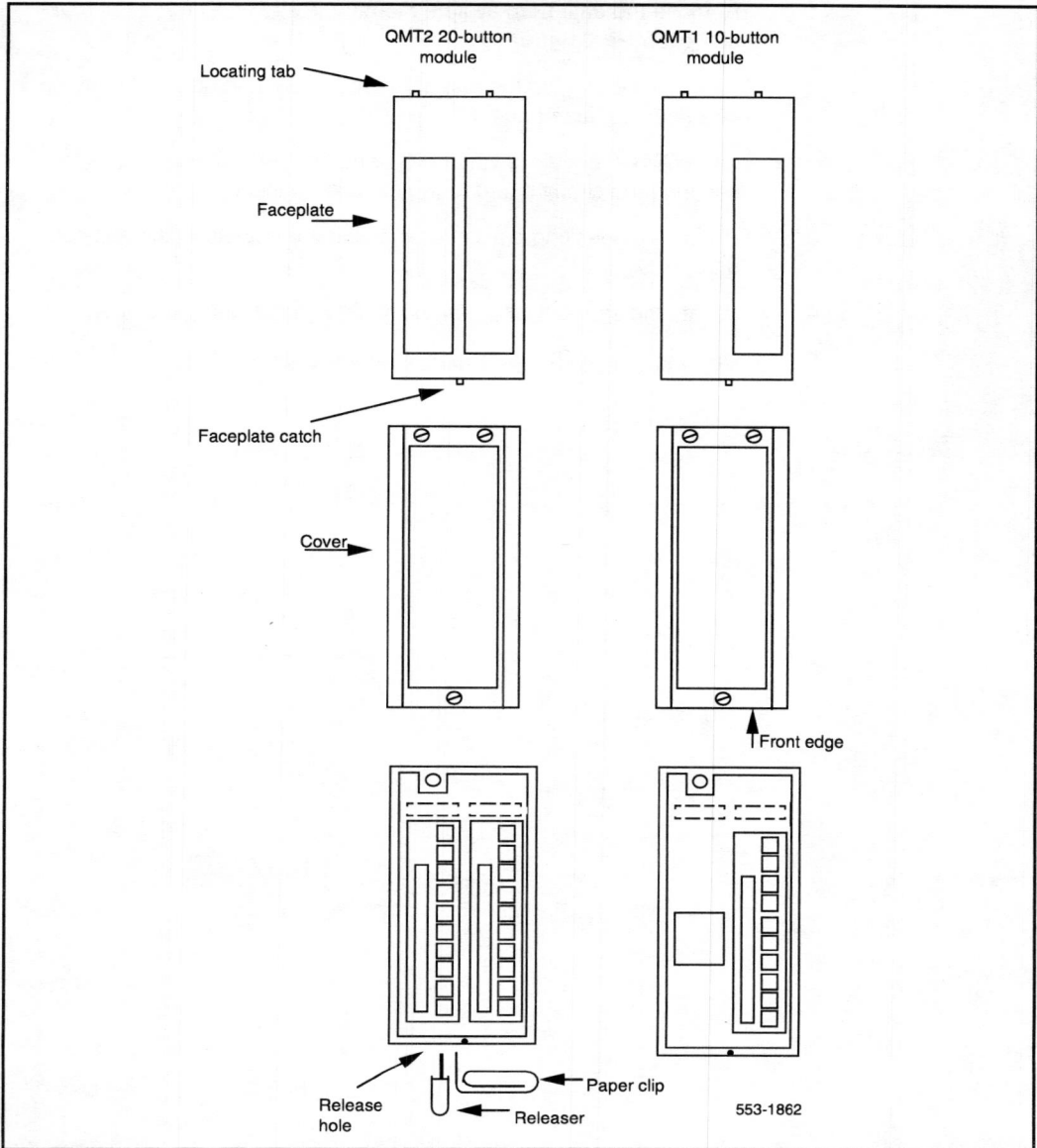
**Connecting the QMT1 and QMT2 add-on module**

- 1      Verify that the address switches are correctly set.
- 2      Remove the filler plate from the right side of the telephone, attendant console, or add-on module. Store the filler plate.
- 3      Place the left side of the new module against the right side of the telephone, attendant console, or installed module, aligning the filler plate openings.
- 4      Lock the new module in place by inserting the locking device, attached to the wiring harness, over the edges of the filler plate openings.
- 5      Extend the module harness into the existing unit and insert the plug into the jack.

If the QMT2 module is of C vintage or earlier, remove the screws securing the circuit board to the module housing and remove the circuit board. Insert the plug of the wiring harness into the connector, replace the circuit board, and secure with the screws.

- 6      Provide the 25 V ac supply if this is the first module being added to an SL-1 telephone.

**Figure 25**  
**QMT1 and QMT2 add-on module faceplate**

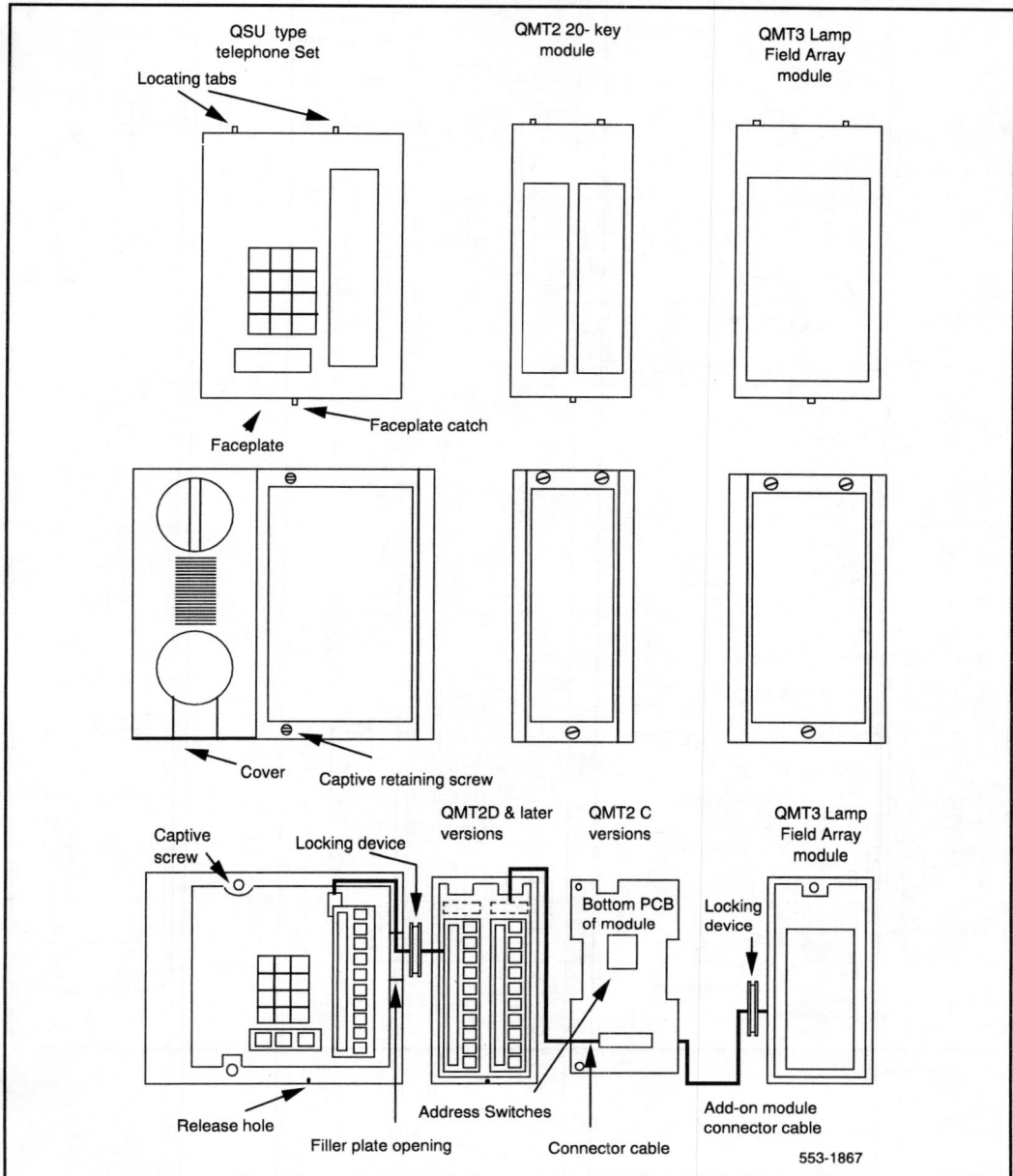


**Procedure 36**

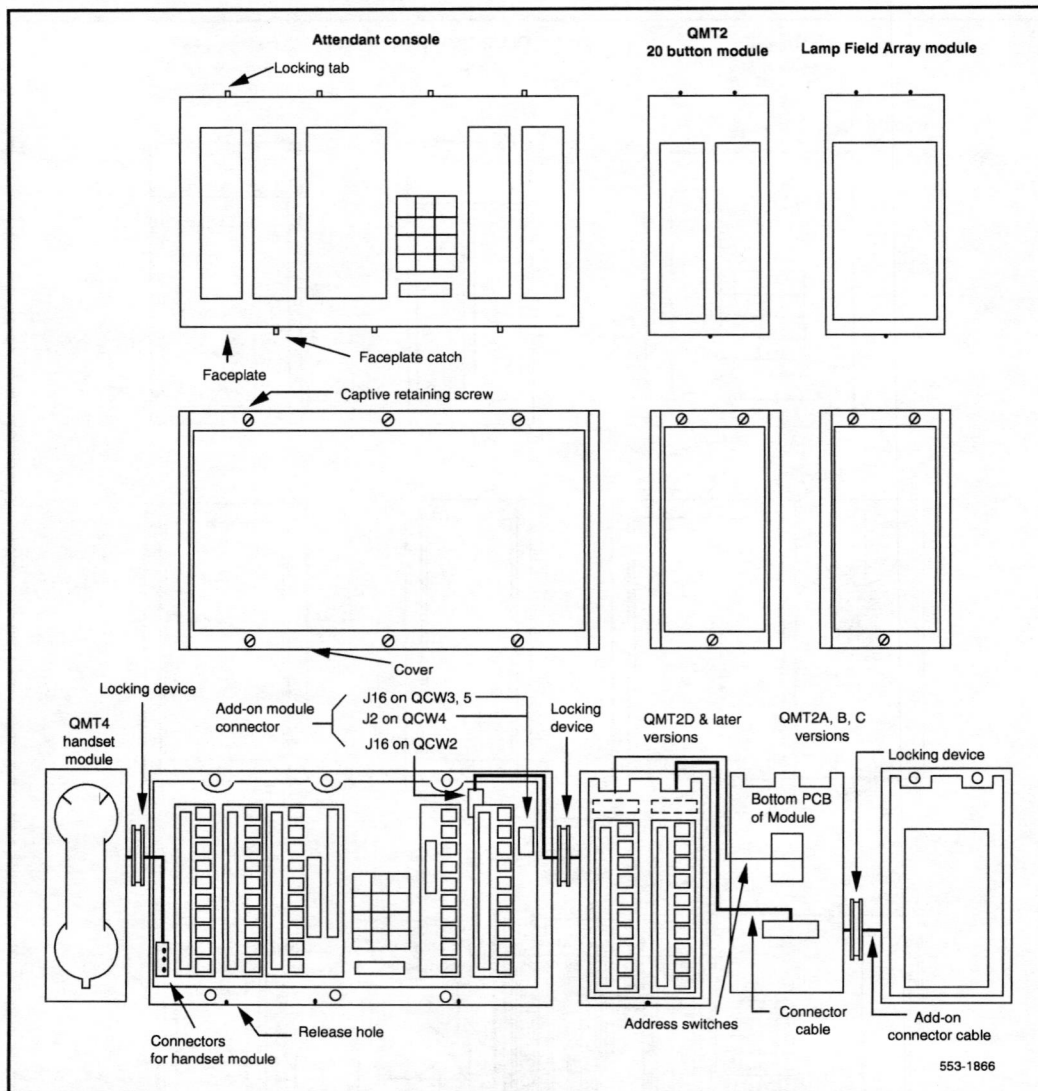
**Disconnecting the QMT1 and QMT2 add-on module**

- 1      Remove the data from system memory. Refer to *X11 input/output guide* (553-3001-400).
- 2      Remove the plug on the end of the module wiring harness from the jack in the adjacent unit.  
  
         If the QMT2 module is vintage C or earlier, remove the screws securing the circuit board to the module housing.
- 3      Remove the locking device, connecting the module to the adjacent unit.
- 4      Locate the stored filler plate and insert it in the filler plate opening.
- 5      Disconnect the 25 V ac supply if not required.

**Figure 26**  
**Add-on module connection to the SL-1 telephone**



**Figure 27**  
**Add-on module connection to an attendant console**





**Table 20**  
**QMT1 key/lamp module address switch settings (SL-1 telephones)**

Added key/lamp strip number (Note)	Address switch settings					
	1	2	3	4	5	6
1	0	0	X	0	0	0
2	0	X	0	0	0	0
3	0	X	X	0	0	0
4	X	0	0	0	0	0
5	X	0	X	0	0	0
6	X	X	0	0	0	0
Switch OFF = 0						
Switch ON = X						
<p><b>Note:</b> When a QMT1 module is added to an SL-1 telephone, the address switch contained in the module must be set according to the corresponding strip number; for example, the first module added is strip 1 and the second module added is strip 2. The number of key strips that can be added to an SL-1 telephone varies from four to six key strips, depending on the type of other add-on modules or kits that are connected to the telephone. Refer to <i>Meridian 1 telephones description and specifications</i> (553-3001-108) for add-on module limitations.</p>						

Table 21

## QMT2 key/lamp module address switch settings (SL-1 telephones)

Added key/lamp strip number (Note)	Address switch settings					
	1	2	3	4	5	6
1, 2	0	0	X	0	X	0
2, 3	0	X	0	0	X	X
3, 4	0	X	X	X	0	0
4, 5	X	0	0	X	0	X
5, 6	X	0	X	X	X	0
Switch OFF = 0						
Switch ON = X						
<b>Note:</b> When a QMT2 module is added to an SL-1 telephone, the address switch contained in the module must be set to the corresponding strip number; for example, the first module added is strip 1 and 2 and the switch is set to address 1 and 2. If a QMT1 precedes a QMT2, then the switch is set to address 2 and 3. The number of key strips that can be added to an SL-1 telephone varies from four to six key strips, depending on the type of other add-on modules or kits that are connected to the telephone. Refer to <i>Meridian 1 telephones description and specifications</i> (553-3001-108) for add-on module limitations.						

**Table 22****QMT1 module address switch settings (attendant consoles)**

Added key/lamp strip number (Note)	Address switch settings					
	1	2	3	4	5	6
First module 4	X	0	0	0	0	0
Second module 5	X	0	X	0	0	0
Switch OFF = 0						
Switch ON = X						
<b>Note:</b> Only two 10-key/lamp strips can be added to an attendant console. The first strip added is assigned to address 4, the second to address 5.						

**Table 23****QMT2 module address switch settings (attendant consoles)**

Added key/lamp strip number (Note)	Address switch settings					
	1	2	3	4	5	6
Strips 4 and 5	X	0	0	X	0	X
Switch OFF = 0						
Switch ON = X						
<b>Note:</b> Only one QMT2 key/lamp strip can be added to an attendant console.						

**Table 24****Jack numbering for add-on module connection**

Equipment	Jack number
SL-1 telephones (see Note)	J1
SL-1 telephone equipped with QKK3 kit	J2 of QKK3
QMT1 add-on module	J2
QMT2C add-on module	J1
QMT2D add-on module	J2
QMT3 add-on module	J6
QCW2, 3, and 5 attendant consoles	J16
QCW4 attendant console	J2
<b>Note:</b> On SL-1 telephones with a digit display, jack J1 is extended to the connector located beside the right-hand filler plate.	

## Designating add-on modules

Be sure to refer to the work order for features enabled and key designations. Refer to *Meridian 1 telephones description and specifications* (553-3001-108) for add-on module limitations. See Figure 26 for an illustration of the add-on module connection to an SL-1 telephone, and see Figure 27 for an illustration of the add-on module connection to an attendant console.

### Procedure 37

#### Designating add-on modules

- 1 Remove the cap, by gently pulling upward, from each key requiring a designation.
- 2 Remove the appropriate designation from the sheet of designations.
- 3 Place the designation in the cap, place the cap over the corresponding key, and gently press down. Repeat for all keys requiring designations.
- 4 Insert a paper clip into the hole at the left or right end of the designation window, and gently pry open the window.
- 5 Insert the number tag, and replace the designation window.

## QMT3 Lamp Field Array

The addition of a QMT3 Lamp Field Array (LFA) on an SL-1 telephone reduces the number of add-on modules that can be equipped on the telephone. Refer to *Meridian 1 telephones description and specifications* (553-3001-108) for a full description of the types and limitations of add-on modules that can be added to an SL-1 telephone.

Refer to *M1250 and M2250 Attendant Consoles description* (553-2201-117) for a description of QCW-type attendant consoles equipped with a QMT3 Lamp Field Array. See “Busy Lamp Field/Console Graphics Module” on page 99 for installation of an LFA on M1250 and M2250 attendant consoles.

The QMT3 LFA module is added to the right-hand side of the attendant console or SL-1 telephone. It can be used with any combination of 10- or 20-key modules and requires a separate 15 V ac power supply.

The QMT3 module should be installed at the extreme right of the attendant console or other add-on modules to avoid the need to disassemble the QMT3 module to gain access to its connector.

The Lamp Field Array module obtains its power through the attendant console. The requirements are

- a reference ground line (0 V)
- 5 V to power the CMOS electronics that control the Lamp Field Array module (c. 50 mA)
- a power source of -12 V for the display of the Lamp Field Array module (c. 10 mA)
- backlighting power

The Lamp Field Array module mounts on the back of the attendant console and is held on with snapfits and two screws.

See Table 25 for the jack numbering for the QMT3 module connection.

See Figure 28 for an illustration of the QMT3 LFA connections to an attendant console and Figure 29 for an illustration of the QMT3 LFA connections to an SL-1 telephone.

### **Procedure 38**

#### **Connecting a QMT3 module to an SL-1 telephone or a QCW attendant console**

- 1**      Unpack and inspect the Lamp Field Array (LFA) for damage. If it is damaged, notify your supplier.
- 2**      Remove the faceplate and cover from the attendant console or from the SL-1 telephone, and from any add-on module that is connected to the right-hand side of the attendant console or telephone.
- 3**      Disconnect the switchhook cable connector from the PCB of the telephone.  
  
If you are adding the LFA to a QSU3 or QSU1F (and later vintage) telephone, go to step 7.
- 4**      Remove the LED strip and cable connector from the telephone.
- 5**      Remove the four dial pad retaining screws. Remove the dial pad cable connector from the PCB.

- 6 Remove the retaining screws at the top and bottom of the PCB. Remove the PCB from the telephone.  
  
If you are adding the LFA to a QSU1C through QSU1E vintage telephone, go to step 9.
- 7 For pre-QSU3D vintage SL-1 telephones: Remove the retaining screws from around the dial pad and remove the dial pad.  
  
**Note:** Some dial pads are soldered to the PCB and cannot be disconnected.
- 8 Remove the retaining screws from the PCB and remove the PCB.
- 9 Install a 2-conductor power cord (with spade-tip connectors) through the base of the telephone alongside the existing line cord. Secure the power cord to the line cord with plastic cable tie.
- 10 Replace the PCB and secure with retaining screws.
- 11 Connect the two leads of the power cord to the AC2 quick-connect terminals.
- 12 Replace the dial pad (if necessary) and secure with retaining screws.
- 13 Remove the filler plate from the right side of the set (or right-most add-on module).
- 14 Lock the LFA to the set (or attached add-on module) by slipping the locking device on the LFA wiring harness over the edges of the filler plate opening. Connect the LFA wiring harness to the jack on the telephone (or attached add-on module).
- 15 Reconnect the switchhook cable connector. Reconnect the LED strip (if necessary) and secure with retaining screws.
- 16 Cross-connect (at the main cross-connect terminal or the intermediate cross-connect point) 15 V ac from the power unit to the attendant console or telephone.
- 17 Reattach the faceplate and cover to the attendant console or SL-1 telephone and the add-on module.
- 18 Configure the QMT3 in the system. Refer to the *X11 input/output guide* (553-3001-400).



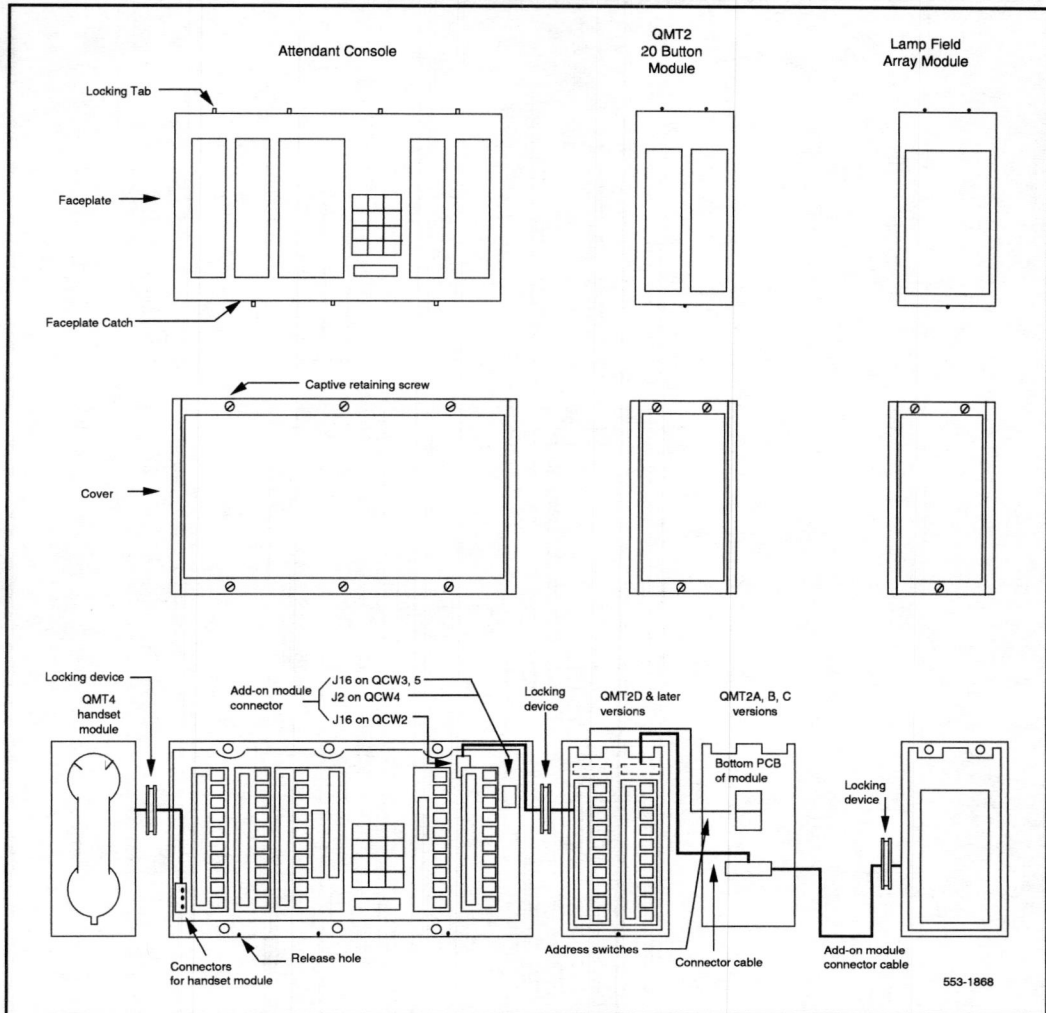
**Procedure 39****Disconnecting the QMT3 module from an SL-1 telephone or a QCW attendant console**

- 1 Remove Lamp Field Array data from the system memory. Refer to the *X11 input/output guide* (553-3001-400).
- 2 Remove the faceplate and cover from the attendant console or the SL-1 telephone and from the add-on module connected to the right-hand side of the telephone.
- 3 Disconnect the Lamp Field Array module.
- 4 Reattach the cover and faceplate on the set or attendant console and on the add-on module.
- 5 Pack the Lamp Field Array module in a container.
- 6 Test the SL-1 telephone or attendant console. Refer to the *Meridian 1 telephones description and specifications* (553-3001-108).

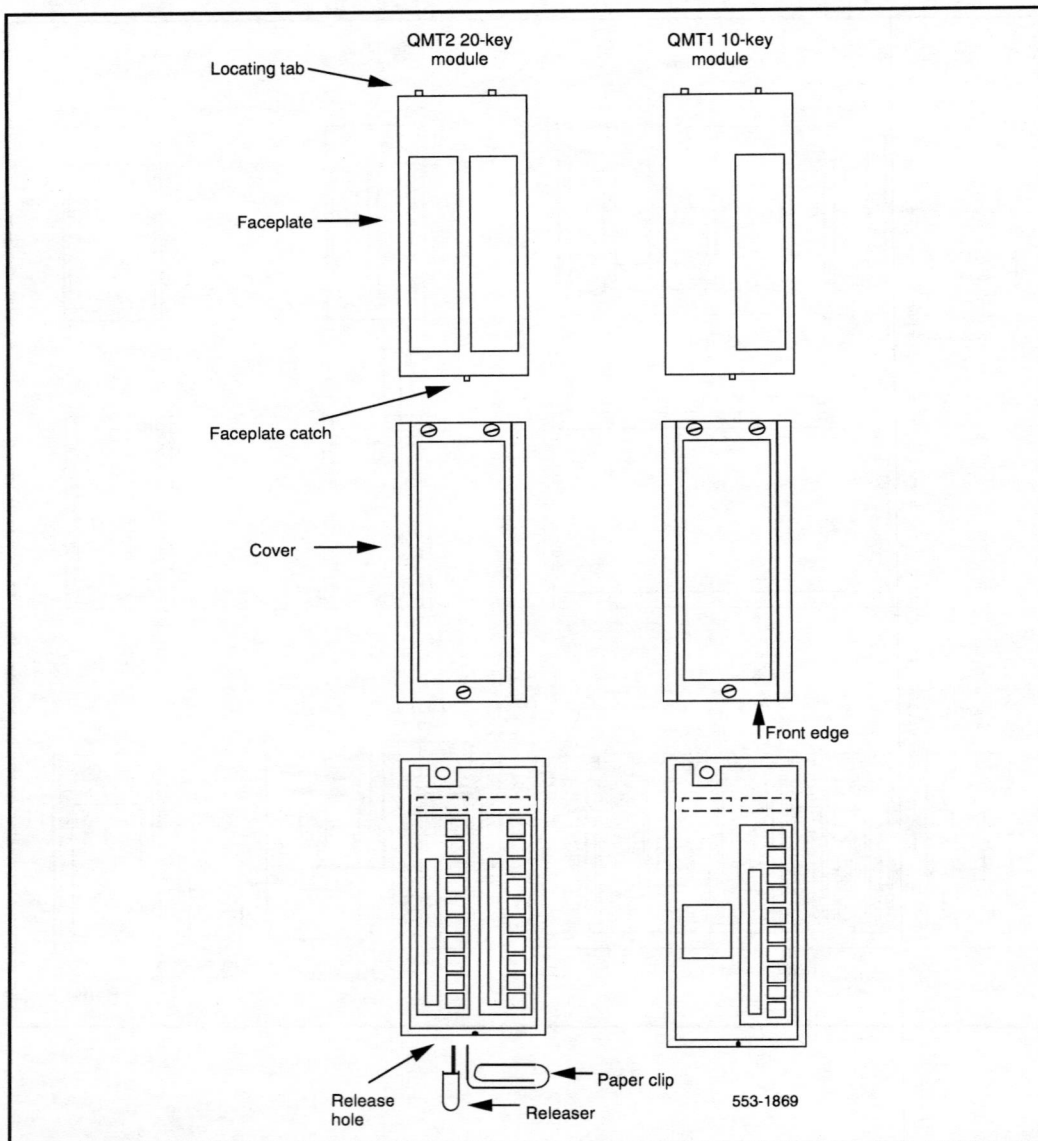
**Table 25****Jack numbering for QMT3 module connection**

Equipment	Jack number
SL-1 telephones (Note)	J1
SL-1 telephone equipped with a QKK3 kit	J2 of QKK3
QMT1 add-on module	J2
QMT2C add-on module	J1
QMT2D add-on module	J2
QMT3 add-on module	J6
QCW2, 3, and 5 attendant consoles	J16
QCW4 attendant console	J2
<b>Note:</b> On telephones with a digit display, jack J1 is extended to the connector located beside the right-hand filler plate.	

**Figure 28**  
**QMT3 Lamp Field Array connections to the attendant console**



**Figure 29**  
**QMT3 Lamp Field Array connections to the SL-1 telephone**



## Busy Lamp Field/Console Graphics Module

The Busy Lamp Field/Console Graphics Module (BLF/CGM) obtains its power through the attendant console (see Figure 30). The requirements are

- a reference ground line (0 V)
- power source of 5 V for the CMOS electronics that control the Lamp Field Array module (c. 50 mA)
- power source of -12 V for the display of the Console Graphics Module (c. 10 mA)
- backlighting power

An external floating 16 V dc (300 mA) power supply is required to be cabled in at the local Main Distribution Frame (MDF) at a maximum of 120 ft (36 m) from the attendant console when the BLF/CGM is installed (A0367601—Transformer). This provides all the power requirements for the M2250 applications, and for backlighting support on the M1250. Basic functionality is supported on the M1250 without the power supply.

The BLF/CGM has a battery that provides backup power to maintain the Supplementary Information when the console is powered down. The battery lifetime is 5 years. To replace the battery, return the BLF/CGM to your supplier.

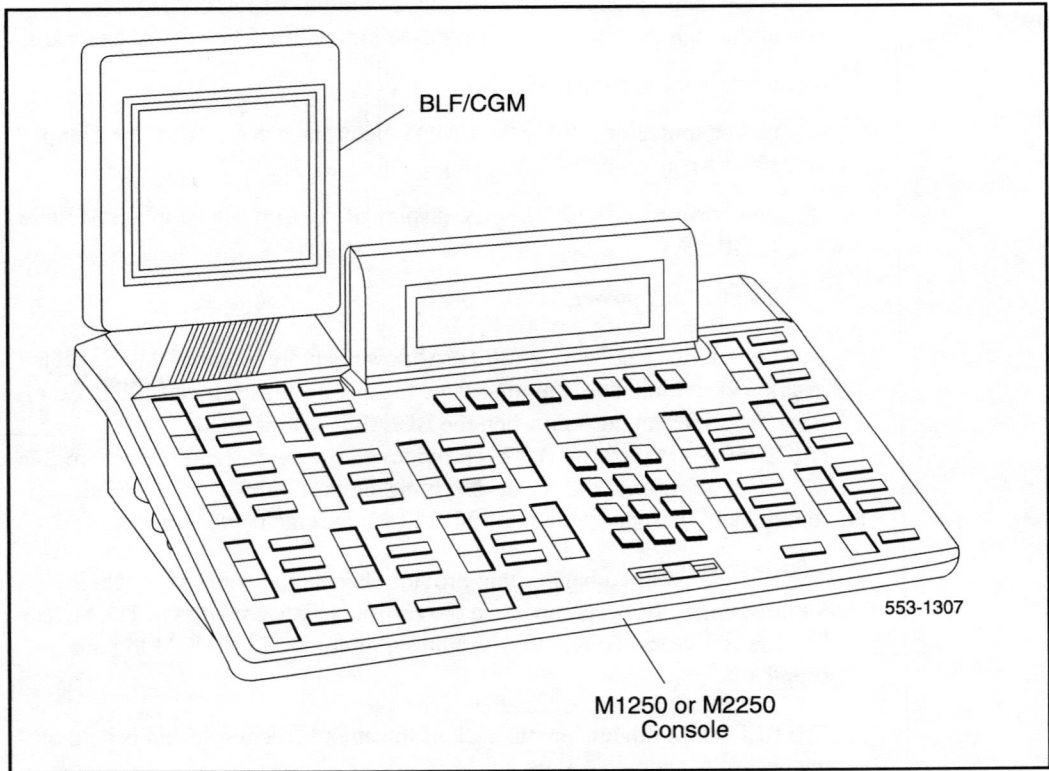
The BLF/CGM mounts on the back of the attendant console and is held on with snapfits and two screws.

The attendant console's top cover must be removed to install the BLF/CGM.

Refer to the *M1250/2250 Attendant Consoles user guide—North America* (P0800563) or the *Busy Lamp Field/Console Graphics Module user guide* (P0706875) for further information. Refer to *M1250 and M2250 Attendant Consoles description* (553-2201-117) for a description of M1250 and M2250 attendant consoles equipped with a BLF/CGM.

Follow normal antistatic precautions when installing the BLF/CGM onto the attendant console.

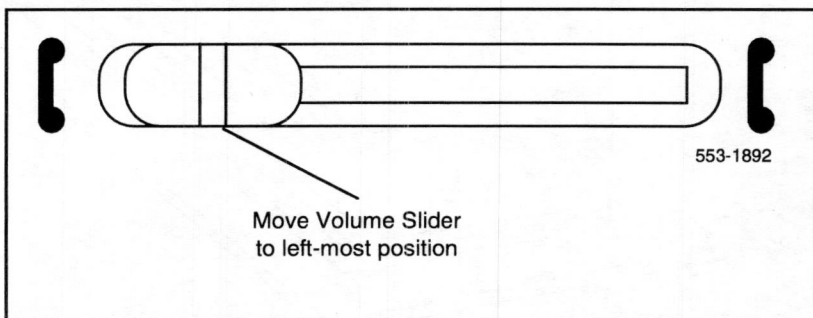
**Figure 30**  
**The Busy Lamp Field/Console Graphics Module on the M1250/M2250 attendant console**



**Procedure 40****Connecting the BLF/CGM to M1250 and M2250 attendant consoles**

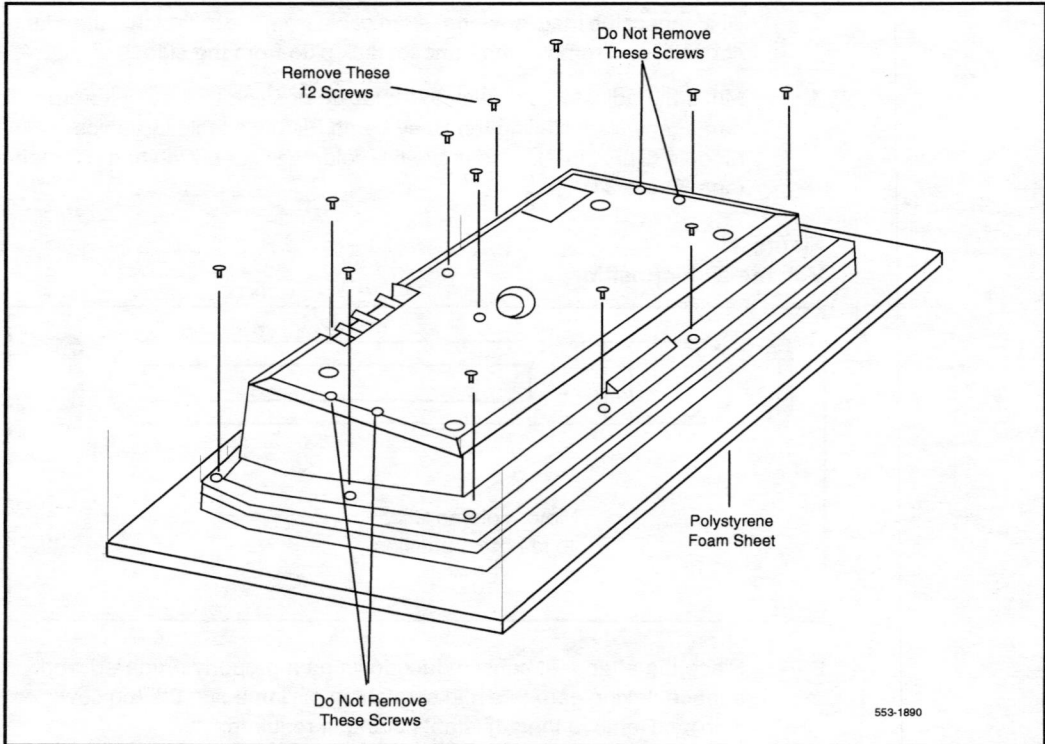
- 1 Disconnect the main power/system cable from the rear of the attendant console, and remove the handset jack plug from the side.
- 2 Move the adjustable display to the down position to protect it from damage while installing the Busy Lamp Field/Console Graphics Module (BLF/CGM). Also move the volume slider switch to the far left (see Figure 31).

**Figure 31**  
**Volume slider position**



- 3 Place the attendant console facedown on a properly prepared work surface, taking care to avoid scratching or damaging the top cover or display. Remove the adjustable stand, if required.  
  
The stand is secured with four screws. Remove the stand as a complete assembly, and set aside.
- 4 Remove the 12 fastening screws in the base of the attendant console that secure the top cover to the console base (see Figure 32). Holding the console base and cover firmly, turn it over so that the top cover is on, facing up.
- 5 For M1250 attendant consoles, raise and hold the top cover to disconnect the two flat cable connectors as well as the alerter cable connector from the bottom PCB (see Figure 33).  
  
For the M2250 attendant console, raise and hold the top cover to remove the single cable connector only. The alerter cable does not need to be removed (see Figure 33).

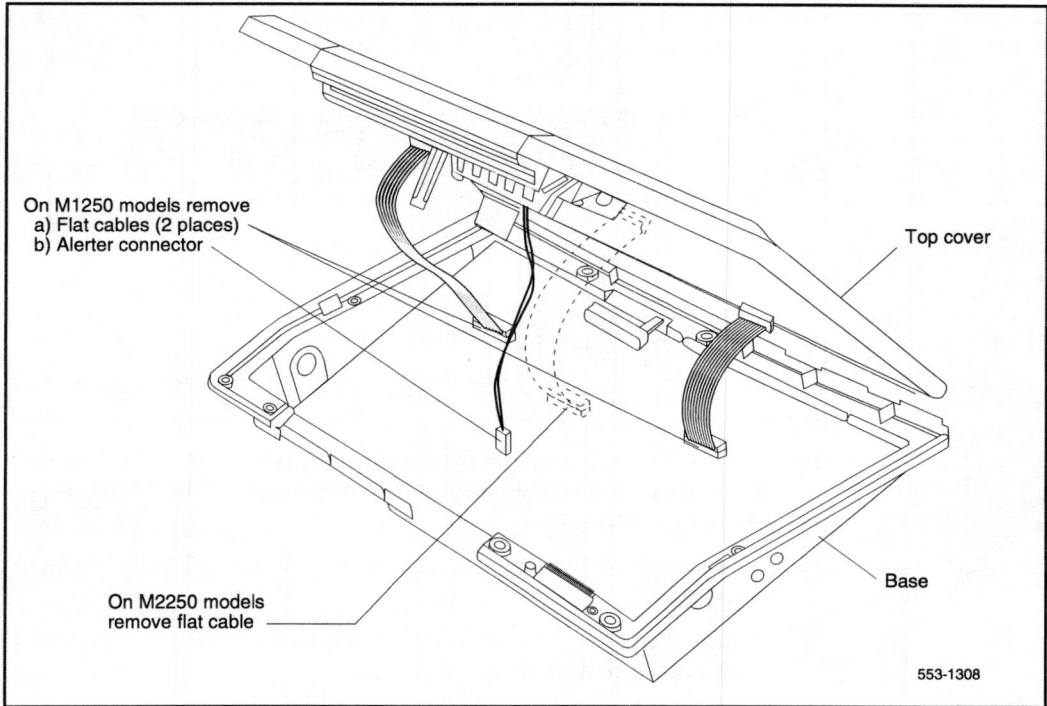
**Figure 32**  
**Removing the fastening screws**



- 6 Remove the top cover and place it upside down to the left of the attendant console.
- 7 Remove the knockout section on the back of the attendant console (see Figure 34) with a small screwdriver or similar tool. Remove any remnants of the breakaway tags.
- 8 Feed the flat ribbon cable for the Busy Lamp Field/Console Graphics Module (BLF/CGM) through the knockout hole in the base of the attendant console.
- 9 Hold the BLF/CGM unit over the console in a vertical position, ensuring that the two locators on the bottom bracket of the BLF/CGM are located in the knockout hole.
- 10 Push down on the attendant console, while holding the BLF/CGM unit, until the two locators snap into place (see Figure 35).

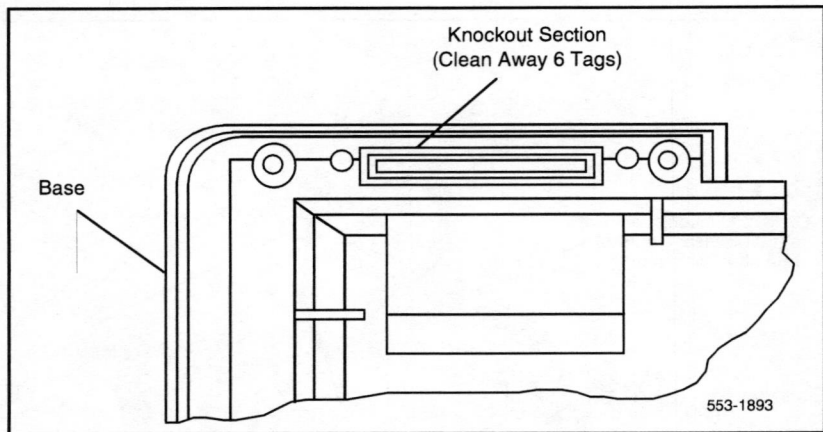


**Figure 33**  
**Removing the top cover**



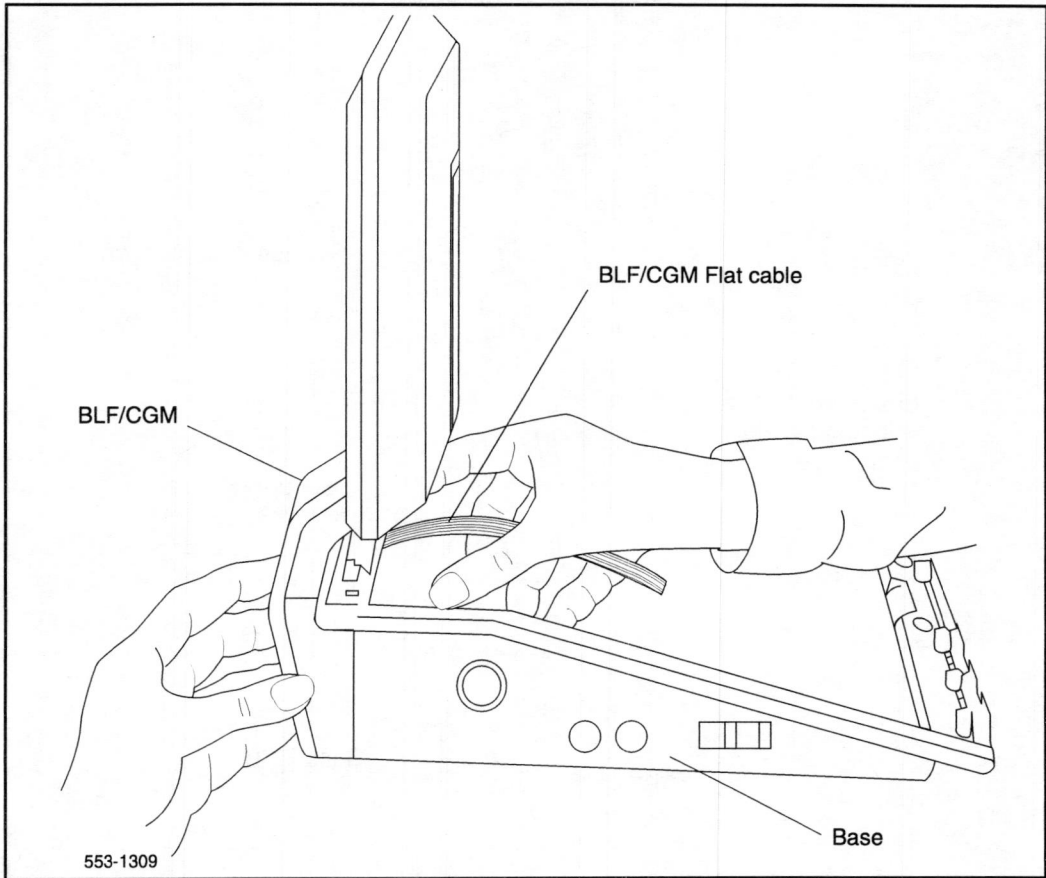
- 11** Fit the BLF/CGM ribbon cable onto the top cover circuit board, into the flexible strip connector J4 (so that the blue line on the cable faces away from the circuit board).
- 12** Hold the top cover over the attendant console and reconnect the cable connector(s) onto the base of the attendant console.  
  
For the M1250, reconnect the alerter cable. Ensure that the protrusion on the support spacer is located in the correct slot on the console (see Figure 36).
- 13** Place the top cover on the console. Slide it back and down into place (see Figure 37). Check that all the cables are in the correct positions and that none are trapped.
- 14** Push the BLF/CGM display into position by rotating it back (see Figure 37).

**Figure 34**  
**Attendant console knockout section**

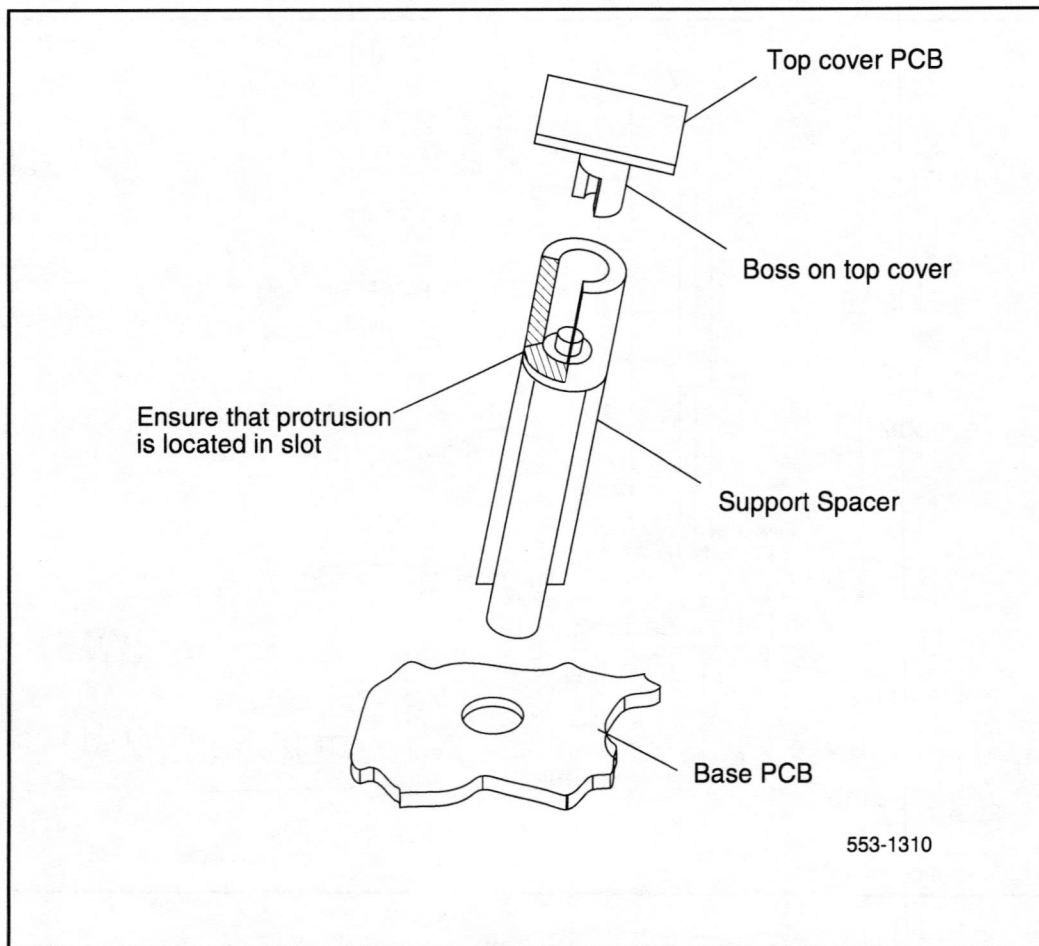


- 15 Ensuring that the volume slider is fully engaged in the correct slider, hold the top cover and console base firmly together. Turn the assembly upside down (see Figure 38).
- 16 Reinsert the 12 screws that secure the top cover to the console base and tighten.
- 17 Insert the two new screws supplied with the BLF/CGM that attach it to the base, and tighten (see Figure 38).
- 18 Cable in BLF power at the local Main Distribution Frame (MDF) as per M1250, M2250 cross-connections (see Procedure 9).
- 19 If required, replace the adjustable stand.
- 20 Reconnect the main system cable to the rear of the console.
- 21 If the BLF/CGM has been correctly installed, the main menu appears when you supply power to the attendant console. Test the BLF/CGM by selecting a menu option. Refer to *Busy Lamp Field/Console Graphics Module user guide* (P0706875) for programming information.
- 22 Define the Busy Lamp Field in the system database. Refer to *X11 features and services* (553-3001-305).
- 23 Test the Busy Lamp Field features using *M1250/2250 Attendant Consoles user guide—North America* (P0800563).

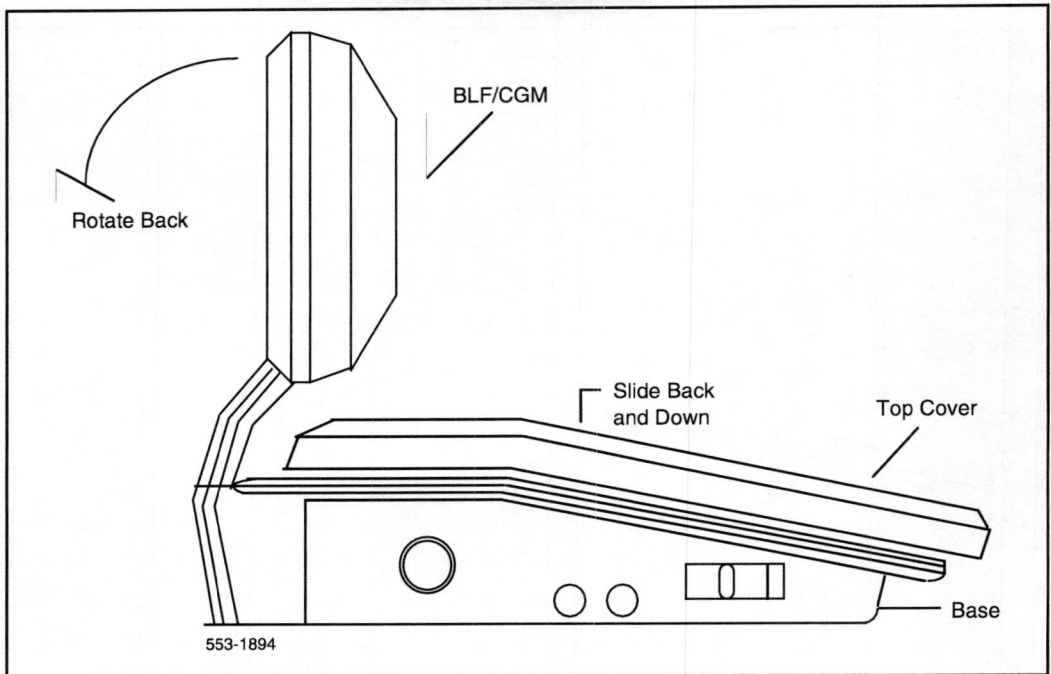
**Figure 35**  
**Connecting the BLF/CGM to the attendant console**



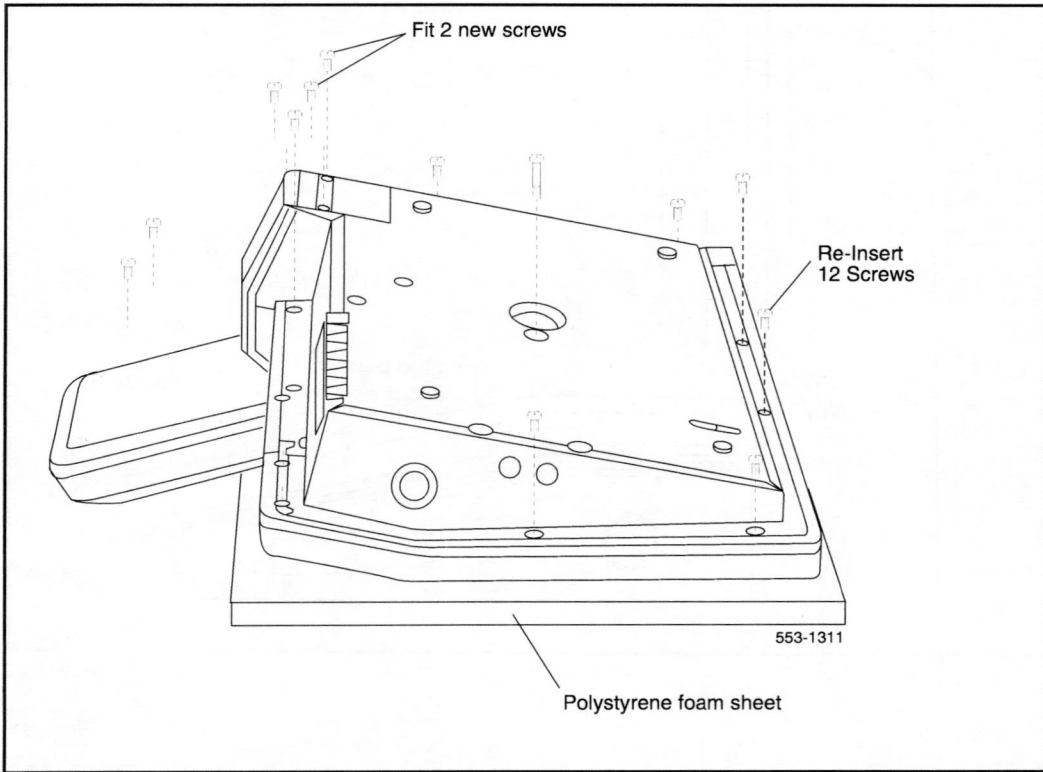
**Figure 36**  
**Support spacer**



**Figure 37**  
**Positioning the top cover and the BLF/CGM**



**Figure 38**  
**Attaching the top cover to the attendant console base and BLF/CGM**



**Procedure 41****Removing the Busy Lamp Field/Console Graphics Module**

- 1 Disconnect the main power/system cable from the rear of the attendant console, and remove the handset jack plug from the side.
- 2 Move the adjustable display to the down position to protect it from damage while removing the BLF/CGM. Also move the volume slider switch to the far left (see Figure 31).
- 3 Place the attendant console facedown on a properly prepared work surface, taking care to avoid scratching or damaging the top cover or display. Remove the adjustable stand, if required.

The stand is secured with four screws. Remove the stand as a complete assembly, and set it aside.

- 4 Remove the 12 fastening screws in the base of the attendant console that secure the top cover to the console base (see Figure 32).

Remove the two screws securing the BLF/CGM to the base of the attendant console.

- 5 Holding the console base and cover firmly, turn it back over so that the top cover is on, facing up.

- 6 For M1250 attendant consoles, raise and hold the top cover to disconnect the two flat cable connectors as well as the alerter cable connector from the bottom PCB (see Figure 33).

For the M2250 attendant console, raise and hold the top cover to remove the single cable connector only. The alerter cable does not need to be removed (see Figure 33).

- 7 Unplug the BLF/CGM ribbon cable from the attendant console.
- 8 Remove the top cover and place it upside down to the left of the attendant console.



- 9**      Pull back the snap-fits on the BLF/CGM to disengage the BLF/CGM from the attendant console.
- 10**     Place the top cover on the console. Slide it back and down into place (see Figure 37). Reconnect all cables in the correct positions, and make sure that none are trapped.
- 11**     Ensuring that the volume slider is fully engaged in the correct slider, hold the top cover and console base firmly together. Turn the assembly upside down (see Figure 38).
- 12**     Reinsert the 12 screws that secure the top cover to the console base and tighten.
- 13**     If required, replace the adjustable stand.
- 14**     Reconnect the main system cable to the rear of the console.

## Attendant Supervisory Module (M2250 console)

The M2250 digital attendant console needs the Attendant Supervisory Module (ASM) to allow supervision. The M2250 cannot be connected to a QPC297 Attendant Console Monitor circuit card. With the ASM installed, the M2250 attendant console can be supervised just like any other attendant console. An M2250 attendant console configured as a supervisor does not need the ASM installed.

To accept the ASM, the minimum vintage M2250 attendant console is AD. To fully support the ASM, the minimum vintage BLF/CGM is AB. The third PWR TN must be programmed and wired out to support the ASM (see Figure 14).

### Procedure 42

#### Installing an Attendant Supervisory Module in an M2250 attendant console

#### CAUTION

Before handling internal set components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1 Disconnect the main power/system cable from the rear of the attendant console, and remove the handset jack plug from the side.
- 2 Move the adjustable display to the down position to protect it from damage while installing the ASM. Move the volume slider switch to the left-most position.
- 3 Place the attendant console facedown on a properly prepared work surface, taking care to avoid scratching or damaging the top cover or display. Remove the adjustable stand, if equipped.  
  
The stand is secured with four screws. Loosen the screws and remove the stand as a complete assembly, and set aside.
- 4 Remove the 12 fastening screws in the base of the attendant console that secure the top cover to the console base (see Figure 32). Holding the console base and cover firmly, turn it back over so that the top cover is on, facing up.

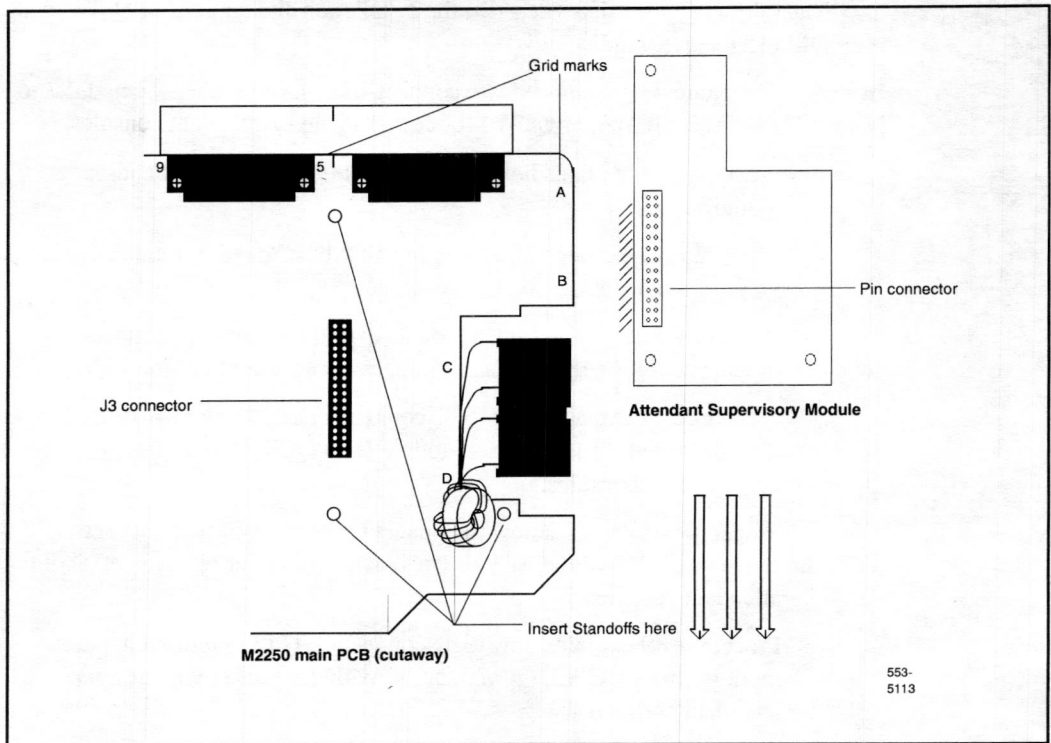
- 5 Raise and hold the top cover to remove the single cable connector. The alerter cable does not need to be removed (see Figure 33). Remove the top cover and place it upside down to the left of the attendant console.
- 6 The attendant console's main PCB has holes located in the upper right-hand side, near grid positions D1, D5, and A5 (see Figure 39). Insert one standoff in each of the holes, twisting it until it is secure.

### CAUTION

Once you insert a standoff, it cannot be removed. Be sure to place each standoff in the correct hole on the main PCB, as shown in Figure 39.

- 7 Position the ASM board over the J3 connector on the console's main PCB. Align the holes on the ASM board with the standoffs and carefully work the ASM pin connector onto connector J3 until firmly seated. See Figure 39.
- 8 Hold the top cover over the attendant console and reconnect the cable connector onto the base of the console.
- 9 Place the top cover on the console. Slide it back and down into place. Check that all the cables are in the correct positions, and that none are trapped.
- 10 Ensure that the volume switch is fully engaged in the correct slider. Hold the top cover and console base firmly together. Turn the assembly upside down.
- 11 Reinsert the 12 screws that secure the top cover to the console base and tighten.
- 12 If required, replace the adjustable stand.
- 13 Reconnect the main system cable to the rear of the console.
- 14 Test the supervisory console feature to make sure you can now properly supervise the M2250 attendant console. Refer to *M1250/2250 Attendant Consoles user guide—North America* (P0800563).

**Figure 39**  
**Identifying the correct grid positions on the main PCB and attaching the ASM**



## QMT4 and QMT15 handset modules

The following procedures describe the installation and removal of QMT4 and QMT15 handset modules:

- Procedure 43 explains how to connect QMT4A or B handset modules to a QCW2, QCW3, or QCW4 (or earlier vintage) attendant consoles.
- Procedure 44 explains how to disconnect QMT4A and B handset modules.
- Procedure 45 explains how to connect QMT4C handset modules to all types of attendant consoles.
- Procedure 46 explains how to connect QMT15 amplified handset modules to QCW4E (and later vintages of) attendant consoles.
- Procedure 47 explains how to disconnect a QMT15 amplified handset module or a QMT4C handset module from QCW4E (and later vintages of) attendant consoles.
- Procedure 48 explains how to connect QMT15 amplified handset modules to QCW2, QCW3, or QCW4D (and earlier vintages of) attendant consoles.
- Procedure 49 explains how to disconnect QMT15 amplified handset modules from QCW2, QCW3, or QCW4D (or earlier vintages of) attendant consoles.

The QMT4 A/B handset module can be attached to the left side of the attendant console or left freestanding, but it cannot be connected to the QCW4E attendant console.

See Figure 40 for an illustration of the QMT4 A/B handset module attached and connected to the attendant console.

The QMT4C can be installed on all attendant consoles.

See Figure 41 for an illustration of the QMT4A, B, and C handset module.

The QMT15 amplified handset module (see Figure 42) cannot be installed on QCW4E (and earlier) attendant consoles equipped with a QMT3 Lamp Field Array (LFA) module.

The QMT15 module cannot be installed on QCW2, QCW3, or QCW4D (and earlier) attendant consoles equipped with a QMT3 LFA module.

See Figure 43 for an illustration of the current limiting kit connections.

**Procedure 43**

**Connecting the QMT4 A/B handset module on a QCW2, QCW3, or QCW4D (or earlier vintages of) attendant console**

- 1** Unplug the handset from the attendant console.
- 2** For QCW2 only: Disengage the first LED strip on the left side of the attendant console by loosening the retaining clips at each end of the LED strip.
- 3** Remove the filler plate from the right side of the handset module and the left side of the attendant console. Store the filler plates.
- 4** Place the right side of the handset module against the left side of the attendant console aligning the filler plate openings.
- 5** Lock the module to the attendant console by inserting the plug adapter into the filler plate opening.
- 6** Insert the module wiring harness through the plug adapter into the attendant console.
- 7** In the attendant console, disconnect the six leads connecting the handset jacks to the printed circuit board (PCB). Insulate and store the six leads.
- 8** Connect the six leads of the module wiring harness to the attendant console PCB (see Table 26).
- 9** For QCW2 only: Replace the LED strip and secure with the two retaining clips.
- 10** Plug the handset into the jacks on the left side of the handset module.

**Procedure 44**

**Disconnecting the QMT4 A/B handset module**

- 1 For QCW2 only: Disengage the first LED strip on the left side of the attendant console by loosening the retaining clips at each end of the LED strip.
- 2 In the attendant console, disconnect the six leads of the handset module wiring harness from the PCB.
- 3 Locate the six insulated handset jack leads stored in the attendant console base.
- 4 Remove the tape from the ends of the leads and connect the leads to the PCB.
- 5 Unlock the handset module from the attendant console by removing the plug adapter from the filler plate.
- 6 Install a filler plate in the filler plate opening on the attendant console.
- 7 For QCW2 only: Reinstall the LED strip and secure it with the two retaining clips.
- 8 Plug the handset into the handset jacks on the lower left side of the attendant console.

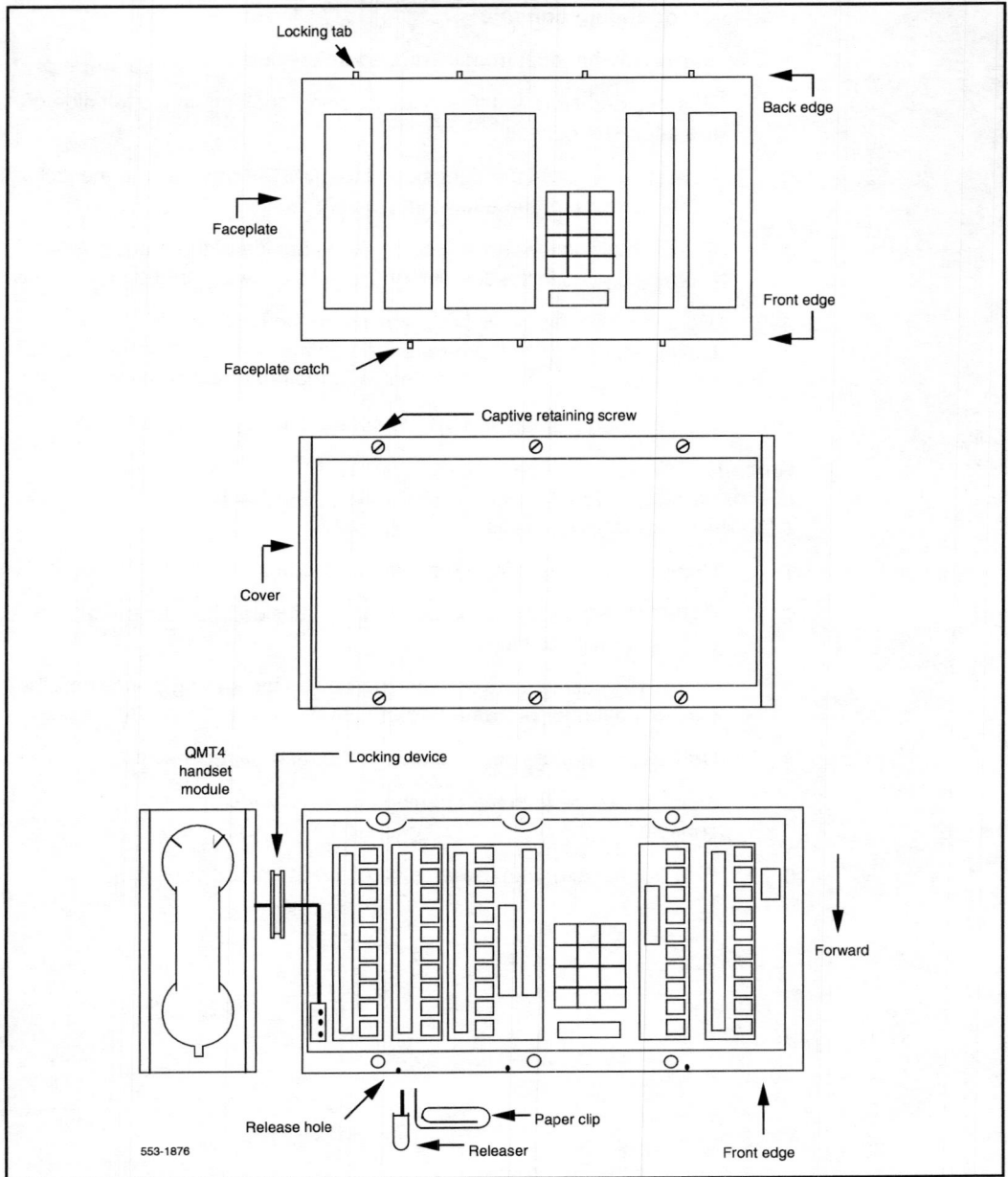
**Procedure 45**

**Connecting the QMT4C handset module**

- 1 Unplug the handset from the attendant console.
- 2 Insert the plugs on the right side of the QMT4C into the jacks on the left side of the attendant console.
- 3 Plug the handset into the left side of the handset module.



**Figure 40**  
**The QMT4 A/B handset module attached and connected to the attendant console**



**Procedure 46**

**Connecting the QMT15 amplified handset module to a QCW4E (and later) attendant console**

- 1 Unplug the handset from the attendant console.
- 2 Remove and store the filler plate from the opening on the left side of the attendant console.
- 3 Insert the plugs on the right side of the QMT15 module into the jacks on the left side of the attendant console.
- 4 Ensure that the locking device on the right side of the module is properly seated in the opening on the left side of the attendant console.
- 5 Tighten down the two locking screws on the locking device. The locking screws should protrude through the bottom of the locking device and press against the inside of the attendant console housing.
- 6 Plug the handset into the left side of the handset module.

**Procedure 47**

**Disconnecting a QMT4C or QMT15 handset module from a QCW4E attendant console**

- 1 Unplug the handset from the handset module.
- 2 If QMT4C, unplug the module from the left side of the attendant console and go to step 6.
- 3 If QMT15, loosen the two locking screws on the locking device until the screws no longer protrude through the bottom of the locking device.
- 4 Unplug the module from the side of the attendant console.
- 5 Install a filler plate in the opening on the left side of the attendant console.
- 6 Plug the handset into the left side of the attendant console.

**Procedure 48****Connecting a QMT15 amplified handset module to a QCW2, QCW3, or QCW4D (or earlier) attendant console**

- 1 Remove and store the filler plate from the opening on the left side of the attendant console.
- 2 Pass the connector assembly (housed in the handset module) through the locking device on the right side of the module.
- 3 Insert the plugs on the right side of the QMT15 module into jacks on the left side of the attendant console.
- 4 Ensure that the locking device on the right side of the module is properly seated in the opening on the left side of the attendant console.
- 5 Tighten down the two locking screws on the locking device. The locking screws should protrude through the bottom of the locking device and press against the inside of the attendant console housing.
- 6 Extend the connector assembly from the QMT15 module to the jack in the attendant console. Insert the plug into the jack.
  - If the attendant console is equipped with QMT1 and/or QMT2 add-on key/lamp module(s), remove the faceplate(s) and cover(s), extend the connector assembly through the openings between the modules, and connect the plug into the jack in the last module.
  - If the QMT2 module is of C vintage or earlier, remove the screws securing the circuit board to the module housing and remove the circuit board. Insert the plug of the connector assembly into jack J1, replace the circuit board, and secure with screws.
- 7 Ensure that the connector assembly wiring does not interfere with the attendant console and module (if equipped) covers.
- 8 Replace the cover and faceplate on the QMT1 and/or QMT2 modules if equipped.
- 9 Plug the handset into the handset module.

**Procedure 49**

**Disconnecting a QMT15 amplified handset module from a QCW2, QCW3, or QCW4D (or earlier) attendant console**

- 1        Unplug the handset from the handset module.
- 2        Remove the faceplate and cover from the QMT1 and/or QMT2 key/lamp module(s) if equipped.
- 3        Remove the connector assembly plug from the jack in the attendant console or last key/lamp module (if equipped).  
  
          If the QMT2 module is vintage C or earlier, remove the screws securing the circuit board to the module housing and remove the circuit board. Remove the connector assembly plug from jack J1. Replace the circuit board and secure with screws.
- 4        Remove the connector assembly from the module(s) and/or attendant console.
- 5        Loosen the two locking screws on the locking device (between the handset module and the attendant console) until the screws no longer protrude through the bottom of the locking device.
- 6        Unplug the QMT15 handset module from the attendant console.
- 7        Install a filler plate in the opening on the left side of the attendant console.
- 8        Replace the cover and faceplate on the QMT1 and/or QMT2 module(s) if provided.
- 9        Plug the handset into the attendant console.

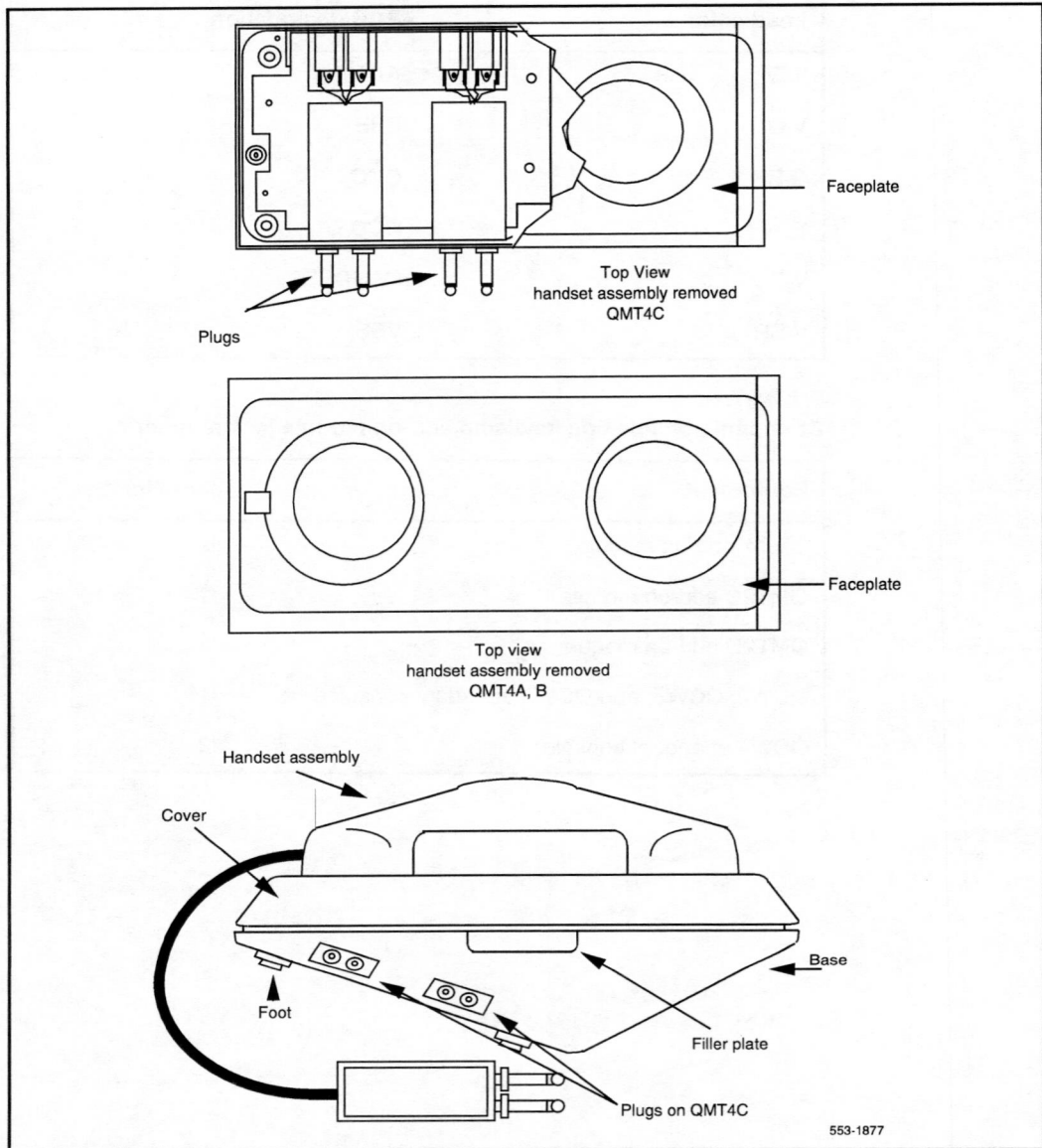
**Table 26**  
**QMT4 A/B handset module wiring harness connections**

<b>Lead color</b>	<b>PCB designation</b>
V-O	AAA
V-G	BBB
S-BR	CCC
S-W	DDD
V-S	HANDSET
V-BR	VSS

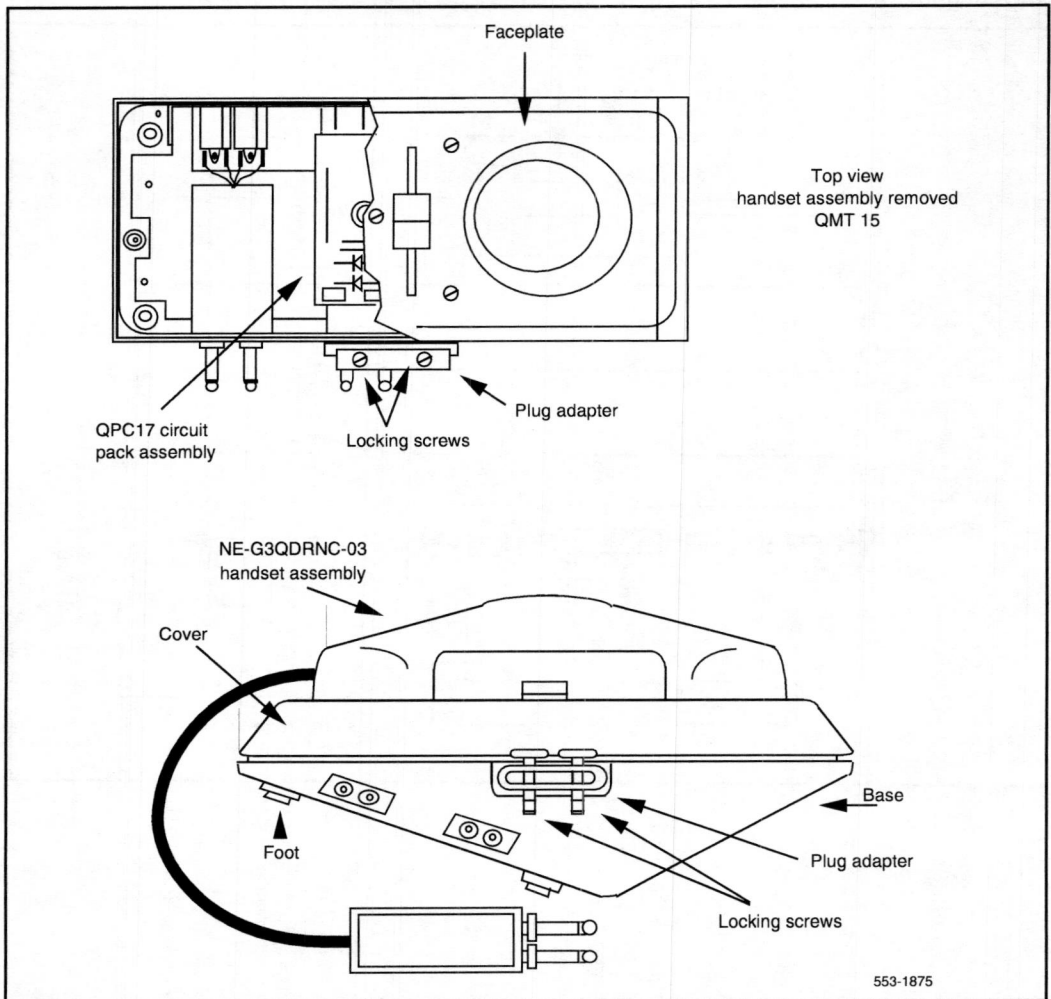
**Table 27**  
**Attendant console and key/lamp add-on module jack numbering**

<b>Equipment</b>	<b>Jack Number</b>
QMT1 add-on module	J2
QMT2C add-on module	J1
QMT2D add-on module	J2
QCW2, QCW3, and QCW5 attendant consoles	J16
QCW4 attendant console	J2

**Figure 41**  
**QMT4A, B, and C handset module**

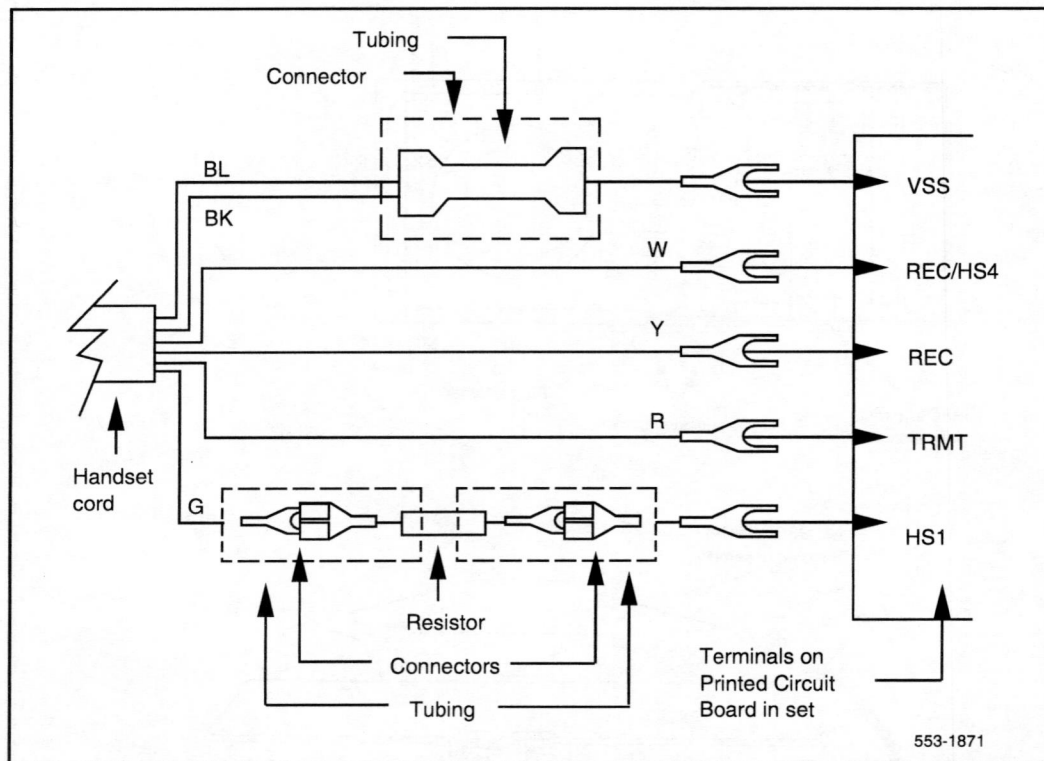


**Figure 42**  
**QMT15 amplified handset module**





**Figure 43**  
**Current limiting kit connections**



## **Amplified handset on SL-1 telephones**

A Current Limiting kit (P0630408) is required to install the amplified handset on an SL-1 telephone.

### **Procedure 50**

#### **Connecting an amplified handset**

- 1** Disconnect the existing handset cord from terminals TRMR, REC/HS4, REC, and VSS on the printed circuit board (PCB) in the telephone.
- 2** Remove the handset and cord from the telephone.
- 3** Connect the white lead from the cord of the amplified handset to terminal REC/HS4 on the PCB in the telephone.
- 4** Connect the yellow lead from the cord of the amplified handset to terminal REC on the PCB in the telephone.
- 5** Connect the red lead from the cord of the amplified handset to terminal TRMR on the PCB in the telephone.
- 6** Connect the blue and black leads from the cord of the amplified handset together with the bridging connector supplied with the Current Limiting kit.
- 7** Connect the extension lead (provided with the kit) to the bridging connector and insulate with tubing.
- 8** Connect the extension lead to the terminal VSS on the PCB in the telephone.
- 9** Connect the green lead from the cord of the amplified handset to the connector on the resistor (provided with the kit) and insulate with tubing.
- 10** Connect the extension lead (provided with the kit) to the resistor and insulate with tubing.
- 11** Connect the extension lead to connector HS1 on the PCB in the telephone.
- 12** Secure the handset cord to the telephone with the retaining clip on the cord.

**Procedure 51**

**Disconnecting an amplified handset**

- 1 Disconnect the amplified handset cord from terminals VSS, REC/HS4, REC, TRMR, and HS1 on the printed circuit board in the telephone.
- 2 Remove the handset and cord from the telephone.
- 3 Connect one white lead from the cord of the regular G-type handset to terminal REC/HS4 on the PCB in the telephone.
- 4 Connect the second white lead from the cord of the handset to terminal REC on the PCB in the telephone.
- 5 Connect the red lead from the cord of the handset to terminal TRMR on the PCB in the telephone.
- 6 Connect the black lead from the cord of the handset to terminal VSS on the PCB in the telephone.
- 7 Secure the handset cord to the telephone with the retaining clip on the cord.

**NE-G6QDC amplified handset on SL-1 telephones**

A Current Limiting kit P0630408 is required to install the amplified handset on an SL-1 telephone.

**Procedure 52**

**Installing an amplified handset**

- 1 Unpack and inspect the Current Limiting kit and handset for damage.
- 2 Remove the faceplate and cover from the SL-1 telephone.
- 3 Connect the Current Limiting kit and the amplified handset.
- 4 Reattach the cover and faceplate to the telephone.
- 5 Test the telephone by placing a call and adjusting the volume control on the handset.

**Procedure 53****Removing an amplified handset**

- 1 Remove the faceplate and cover from the telephone.
- 2 Disconnect the Current Limiting kit and handset and connect the regular handset.
- 3 Reattach the faceplate and cover to the telephone.
- 4 Test the telephone by placing a call.

**QKK1 and QKK3 Handsfree unit interface kits**

The QKK1 kit is used to modify an SL-1 telephone when a QSU-type Handsfree unit is to be added to the telephone.

The QKK3 kit is used to modify an SL-1 telephone when a QSU-type Handsfree unit is to be added to the telephone and Automatic Answerback is to be provided. The addition of a QKK3 kit reduces the number of key strip modules that can be added to an SL-1 telephone. Refer to *Meridian 1 telephones description and specifications* (553-3001-108) for add-on module limitations.

Both kits require a 24 V ac power supply and can be used to extend the range of the telephone as described in *Meridian 1 telephones description and specifications* (553-3001-108).

Procedures 54 and 55 explain how to connect and disconnect the QKK1 interface kit, and Procedures 56 and 57, the QKK3 interface kit.

**Procedure 54**  
**Connecting the QKK1 kit**

- 1 Disconnect the loudspeaker leads.
- 2 Remove the left-hand filler plate from the telephone.
- 3 Mount the PCB of the kit in the base of the telephone using the two attached mounting screws.
- 4 Connect the Y-BR lead of the PCB to the C15 terminal in the telephone or to the REM PWR terminal.
- 5 Insert connector P3 of the kit into jack J3 of the telephone.
- 6 Insert the kit's 15-pin plug assembly into the left-hand filler plate opening.
- 7 Connect the 25 V ac auxiliary power supply to the telephone.
- 8 Connect the loudspeaker leads.

**Procedure 55**  
**Disconnecting the QKK1 kit**

- 1 Disconnect the loudspeaker leads.
- 2 Remove the kit's 15-pin plug assembly from the left-hand filler plate opening in the telephone.
- 3 Remove connector P3 of the kit from jack J3 of the telephone.
- 4 Disconnect the Y-BR lead of the kit PCB from the C15 terminal in the telephone or from REM PWR terminal.
- 5 Remove the two mounting screws that secure the kit PCB in the base of the telephone. Remove the PCB.
- 6 Connect the loudspeaker leads.
- 7 Insert a filler plate into the filler plate opening.
- 8 Disconnect the 25 V ac if it is not required.

**Procedure 56**  
**Connecting the QKK3 kit**

- 1 Disconnect the loudspeaker leads.
- 2 Remove the left-hand filler plate from the telephone.
- 3 Mount the PCB of the kit in the base of the telephone using the two attached mounting screws.
- 4 Insert connector P3 of the kit into jack J3 of the telephone.
- 5 If the telephone is equipped with a digit display or add-on module, move connector P1 of the digit display or add-on module from jack J1 of the telephone to jack J2 of the kit.
- 6 Insert connector P1 of the kit into jack J1 of the telephone.
- 7 Insert the kit's 15-pin plug assembly into the filler plate opening.
- 8 Connect a 25 V ac auxiliary power supply to the telephone.
- 9 Connect the loudspeaker leads.

**Procedure 57**  
**Disconnecting the QKK3 kit**

- 1 Disconnect the loudspeaker leads.
- 2 Remove the kit's 15-pair plug assembly from the left-hand filler plate opening in the telephone.
- 3 Remove connector P1 of the kit from jack J1 of the telephone.
- 4 If the telephone is equipped with a digit display or add-on module, move connector P1 of the digit display or add-on module from jack J2 of the kit to jack J1 of the telephone.
- 5 Remove connector P3 of the kit from jack J3 of the telephone.
- 6 Remove the two mounting screws securing the kit PCB in the base of the telephone. Remove the PCB.
- 7 Connect the loudspeaker leads.
- 8 Insert a filler plate into the filler plate opening.
- 9 Disconnect the 25 V ac supply if it is not required.

## **QSU1 Handsfree unit**

Connection of a Handsfree unit to an SL-1 telephone requires a QKK1 Handsfree or QKK3 automatic Handsfree interface kit.

Only the QUS1C2 vintage Handsfree unit requires modification when used with a QKK3 interface kit. Other vintages of QUS1C Handsfree units do not require modification.

### **Procedure 58**

#### **Connecting the QSU1 Handsfree unit**

- 1     Remove straps E1 and E2 on the PCB of the telephone if equipped; otherwise, move the connection from terminal TRMR to KR2 and from terminal REC/HS4 to KR4.

For QSU1C and QSU1D telephones, the dial pad must be removed to gain access to E2. For QSU1F telephones, disconnect one end of E1 and E2 by loosening the screw terminal and bending back the straps. Ensure that these straps do not contact any other terminal. Tighten the screws. These wiring modifications must be reversed if the QKK unit is removed.

- 2     Install the interface kit as described in Procedure 54 (QKK1) or Procedure 56 (QKK3).
- 3     Plug the Handsfree unit into the interface kit's 15-pin connector.

### **Procedure 59**

#### **Modifying a QUS1C2 Handsfree unit used with a QKK3 interface kit**

- 1     Loosen the retaining screws on the bottom of the Handsfree unit, and remove the cover.
- 2     Move the Y-S lead from terminal B.\*(2C for QUS1C4/5) to terminal VBB with the R-G lead.
- 3     Move the S-Y lead from terminal R.\*(M2 for QUS1C4/5) to terminal ON with the O-V lead.
- 4     Move the G lead from terminal M2.\*(2O for QUS1C4/5) to terminal OFF with the S-V lead.
- 5     Replace the cover on the QUS1C unit and tighten the retaining screws.

It is not necessary to return these leads to their original terminals when using a QKK2 interface kit.



**Procedure 60****Disconnecting the QSU1 Handsfree unit**

- 1 Reconnect straps E1 and E2 on the PCB of the telephone, if equipped. Otherwise, move the connection from terminal KR2 to TRMR and from terminal KR4 to REC/HS4.

For QSU1C and QSU1D telephones, the dial pad must be removed to gain access to E2. For QSU1F telephones, bend the E1 and E2 straps back to the terminals and reconnect. Tighten the screws.

- 2 Unplug the Handsfree unit from the interface kit's 15-pin connector.
- 3 Remove the interface kit if not required for remote powering.

**Handsfree unit on a QSU71 telephone**

QSU71 telephones are shipped with Handsfree enabled. If Handsfree has been disabled, follow the steps in Procedure 61.

**Procedure 61****Enabling Handsfree**

- 1 Remove the handset and place it beside the telephone.
- 2 Place the telephone facedown on a flat surface and leave it in this position until after the base and TELADAPT cords are reattached.
- 3 Disconnect the TELADAPT cords from the base of the telephone.
- 4 Remove the four retaining screws from the base of the QSU71 telephone and carefully lift off the base.
- 5 Locate the 3-pin header connector J6 on the upper housing circuit board. If Handsfree is disabled, the header connector removable plug will not be inserted into the connector J6 socket pin 1 (pin 1 of the 3-pin header connector is indicated by a white dot on the circuit board).
- 6 Unplug the removable header connector by gently pulling on the solid head of the removable plug.
- 7 Place the removable plug into the connector, ensuring pins 1 and 2 are connected to the pins 1 and 2 of the connector socket.

- 8 If Automatic Answerback is required, go to Procedure 63; otherwise, reattach the base of the telephone to the upper housing cover using the four screws removed in step 4.
- 9 Reconnect the TELADAPT cords to the base of the telephone.
- 10 Turn the telephone faceup and place the handset on the hook.

**Procedure 62**  
**Disabling Handsfree**

- 1 Remove the handset and place it beside the telephone.
- 2 Place the telephone facedown on a flat surface and leave it in this position until after the base and TELADAPT cords are reattached.
- 3 Disconnect the TELADAPT cords from the base of the telephone.
- 4 Remove the four retaining screws from the base of the QSU71 telephone and carefully lift off the base.
- 5 Locate the 3-pin header connector J6 on the upper housing circuit board.  
  
If Handsfree is enabled, header connector removable plug pins 1 and 2 will be inserted into the connector J6 socket pins 1 and 2 (pin 1 of the 3-pin header connector is indicated by a white dot on the circuit board).
- 6 Unplug the header connector by gently pulling on the solid head of the removable plug.
- 7 Place the removable plug into the connector, ensuring pin 1 is not connected to the connector socket.
- 8 Reattach the base of the telephone to the upper housing cover using the four screws removed in step 4.
- 9 Reconnect the TELADAPT cords to the base of the telephone.
- 10 Turn the telephone faceup and place the handset on the hook.

## **QKK8 Automatic Answerback**

The QKK8 Automatic Answerback kit can be installed only in M1109 Compact (QSU71) telephones.

### **Procedure 63**

#### **Installing the QKK8 unit**

- 1** Remove the handset and place it beside the telephone.
- 2** Place the telephone facedown on a flat surface and leave the telephone in this position until after the base and TELADAPT cords are reattached.
- 3** Disconnect the TELADAPT cords from the base of the telephone.
- 4** Remove the four retaining screws from the base of the QSU71 telephone, and carefully lift off the base and place it beside the telephone.
- 5** Place the QKK8 unit on top of the mounting holes located on the top right corner of the base (viewed with the base flat, handset to the left).
- 6** Secure the QKK8 unit to the base of the telephone with the screws provided.
- 7** Connect the QKK8 connecting plug to the J3 connector (located on the upper housing circuit board).
- 8** Reattach the base of the telephone to the upper housing using the screws removed in step 4.
- 9** Turn the telephone faceup and place the handset on the hook.

**Procedure 64**  
**Removing the QKK8 unit**

- 1 Remove the handset and place it beside the telephone.
- 2 Place the telephone facedown on a flat surface and leave it in this position until after the base and TELADAPT cords are reattached.
- 3 Disconnect the TELADAPT cords from the base of the telephone.
- 4 Remove the four retaining screws from the base of the QSU71 telephone, and carefully lift off the base and place it beside the telephone.
- 5 Disconnect the QKK8 connecting plug from the J3 connector (located on the upper housing circuit board).
- 6 Remove the screws attaching the QKK8 unit to the base of the telephone, and remove the QKK8 unit from the base.
- 7 Reattach the base of the telephone to the upper housing using the screws removed in step 4.
- 8 Turn the telephone faceup and place the handset on the hook.

See Table 28 for a listing of the SL-1 telephone connections.

**Table 28**  
**SL-1 telephone connections**

Mounting cord		Connecting block designations				Inside wire colors	
Lead name	Color	NE-47QA or QBB1B	NE-283 73 5001 adapter	NE-625F TELADAPT	Z station wire	16-25-pair	Connect to equipment TN
Audio T	G	G	1T	T1 (G)	G	W-BL	First pair Tip
Audio R	R	R	1R	R1 (R)	R	BL-W	First pair Ring
SIG T	BK	BK	X1	AUX (BK)	BK	W-O	Second pair Tip
SIG R	Y	Y	X2	GRD (Y)	Y	O-W	Second pair Ring
AC1	BL	5	R	T2 (BL)		W-SL	Aux power Note 1
AC1	W	6	B	R2 (W)		SL-W	

**Note 1:** Connect to auxiliary power when the telephone is equipped with add-on modules. Telephones with a Digit Display always require an auxiliary 25-V supply.

Use one of the following for auxiliary power:

25 V ac and 15 V ac transformers located within 25 ft of the telephone.

QUT1 or QUAA1 centralized power supply. To prevent noise and cross talk, each telephone should have its own transformer or fuse (if using centralized power).

**Note 2:** See the cross-connections to SL-1 system equipment.

## **QKM11 adapter kit**

The QKM11A adapter kit is used to upgrade existing QSU6B or QSU7C SL-1 telephones to vintage QSU6C or QSU7D, respectively. This kit replaces covers, relocating the agent jacks from the left-hand side to the front of the telephone. The kit includes a molded plastic cover, cable assembly, hole plug buttons, and required screw, and washers.

### **Procedure 65**

#### **QKM11 adapter kit installation**

- 1**      Remove the faceplate and cover from the telephone (vintage QSU6B or QSU7C).
- 2**      Detach the loudspeaker and foam insert.
- 3**      Unscrew and remove the lower jacks from the left-hand side of the telephone.
- 4**      Remove the connector cable between the QPC266 subboard and QPC100 main board.
- 5**      Remove the QPC266 subboard from the base of the telephone and attach it to the underside of the new cover with supplied screws.
- 6**      Using the cable connector supplied with the adapter kit, reconnect the QPC266 subboard to the QPC100 main board.
- 7**      Connect the jacks (removed in step 3) into the front of the new telephone cover.
- 8**      Connect the foam insert and loudspeaker (removed in step 2) to the new telephone cover.
- 9**      Use the hole plug buttons supplied with the adapter kit to fill the holes in the left-hand side of the telephone (where the agent jacks were).
- 10**     Attach the new cover and faceplate to the telephone.
- 11**     Test the telephone. Refer to the *X11 input/output guide* (553-3001-400).

## **QKM13 Light Probe kit**

The light probe enables sight-impaired attendants or SL-1 telephone users to use existing QCW-type attendant consoles or QSU-type SL-1 telephones.

The probe has a light sensor on one end and a small button on the other end. To operate the probe, the user presses the button and then scans the LED strips on the attendant console or SL-1 telephone. A tone is heard in the headset or handset when the light sensor is placed over an LED that is on.

Some devices inside the Light Probe kit can be damaged by static electricity. Before working on the Light Probe kit, touch the ground or faceplate contact of the set or attendant console to discharge electricity from your body.

The QKM13A kit cannot be added to an attendant console equipped with the QMT3 Busy Lamp Module.

A P0643059 connector kit is required to install the QKM13 in an SL-1 telephone.

### **Procedure 66**

#### **Installing the QKM13 Light Probe kit in an attendant console**

- 1** Remove the faceplate and cover from the attendant console and add-on module(s) if equipped.
- 2** Remove the left-hand filler plate from the attendant console.
- 3** This step applies to all attendant consoles except QCW4E and later vintages.
  - Connect the S-G lead from the Light Probe PCB to terminal BBB located on the left front corner of the PCB in the attendant console base assembly.
  - Connect the S-Y lead from the Light Probe PCB to terminal VSS located on the left front corner of the PCB in the attendant console base assembly.
  - Plug the connector on the BL-R lead into connector J16 (J2 on QCW4 attendant consoles) located at the right rear corner of the PCB in the attendant console base assembly, or the extension jack in the last add-on module, if equipped.



- 4    This step applies only to QCW4E (and later vintage) attendant consoles.
  - Turn the attendant console upside down.
  - Remove the slide at the bottom of the attendant console to obtain access to the line cord connector.
  - Remove the screw securing the connectors and separate the connectors.
  - Turn the attendant console rightside up.
  - Remove the three screws along the top edge and the three screws along the bottom edge of the main printed circuit board (PCB) of the attendant console.
  - Lift the PCB assembly from the attendant console.
  - Using a spare lead from the Light Probe kit, extend the S-G lead to terminal JK5-S located near the line cord connector on the lower PCB.
  - Using a spare lead from the Light Probe kit, extend the S-Y lead to terminal COMM located near the line cord connector on the lower PCB.
  - Reinstall the main PCB in the attendant console.
  - Plug the connector on the BL-R lead into connector J2 located at the right rear corner of the PCB in the attendant console base assembly, or the extension jack in the last add-on module, if equipped.
  - Turn the attendant console upside down, reconnect the line cord connector, and secure it to the bottom of the attendant console with the retaining screw.
  - Reinstall the slide on the line cord connector opening and turn the attendant console rightside up.
- 5    Insert the Light Probe PCB into the filler plate opening on the left side of the attendant console.
- 6    Replace the cover and faceplate on the attendant console and module(s), if equipped.
- 7    Plug the Light Probe cable into the jack on the PCB in the filler plate opening on the left side of the attendant console.

- 8 Plug the headset or handset into either jack on the attendant console and test the Light Probe. A tone should be heard only when the probe is over a lit LED. The headset or handset should be plugged into the jack (on the attendant console) that provides the loudest tone.

**Procedure 67****Removing the QKM13 Light Probe kit from an attendant console**

- 1 Unplug the Light Probe cable from the PCB jack in the filler plate opening on the left side of the attendant console.
- 2 Remove the faceplate and cover from the attendant console and add-on module(s), if equipped.
- 3 This step applies to all attendant consoles except QCW4E and later vintages.
  - Disconnect the connector on the BL-R lead from connector J16 (J2 on QCW4 attendant consoles) located at the right rear corner of PCB in the attendant console base assembly, or the extension jack in last add-on module, if equipped.
  - Disconnect the S-G lead from the Light Probe PCB to the terminal BBB located on the left front corner of the PCB in the attendant console base assembly.
  - Disconnect the S-Y lead from the Light Probe PCB to the terminal VSS located on the left front corner of the PCB in the attendant console base assembly.
- 4 This step applies only to QCW4E (and later vintage) attendant consoles.
  - Turn the attendant console upside down.
  - Remove the slide at the bottom of the attendant console to obtain access to the line cord connector.
  - Remove the screw securing the connectors and separate the connectors.
  - Turn the attendant console rightside up.
  - Disconnect the connector on the BL-R lead from connector J2 located at the right rear corner of the PCB in the attendant console base assembly, or the extension jack in the last add-on module, if equipped.
  - Remove the three screws along the top edge and three screws along the bottom edge of the main PCB of the attendant console.
  - Lift the PCB assembly from the attendant console.

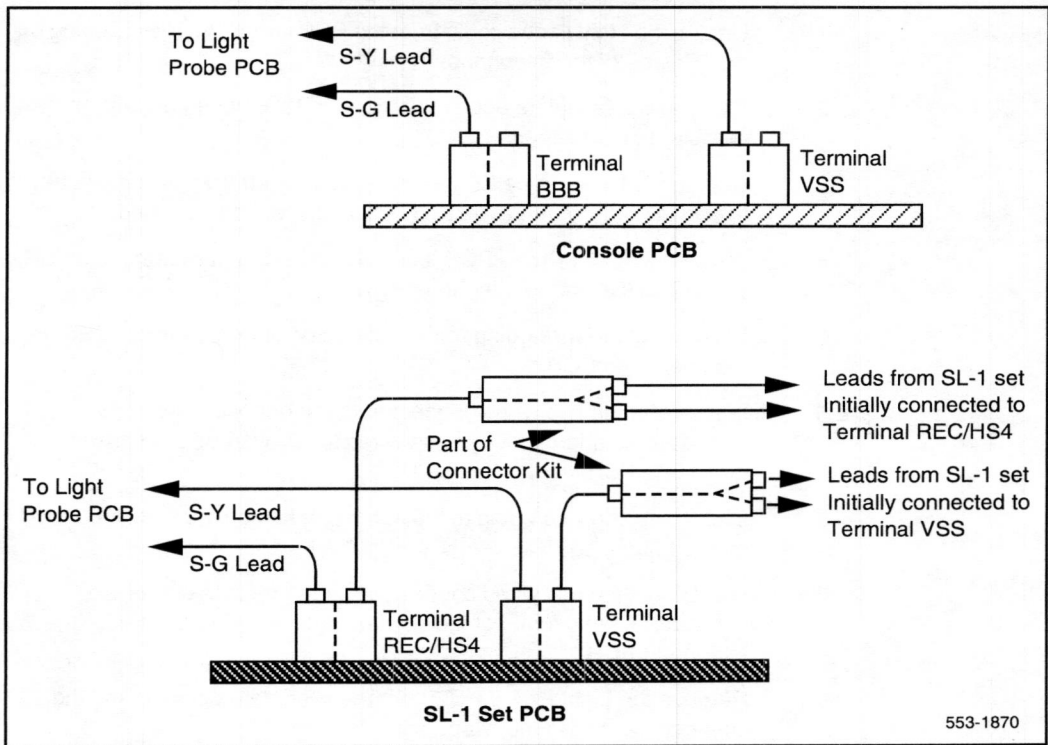
- Disconnect the S-G lead from the Light Probe kit to the terminal JK5-S located near the line cord connector on the lower PCB.
  - Disconnect the S-Y lead from the Light Probe kit to the terminal COMM located near the line cord connector on the lower PCB.
  - Reinstall the main PCB in the attendant console.
  - Turn the attendant console upside down, reconnect the line cord connector, and secure it to the bottom of the attendant console with a retaining screw.
  - Reinstall the slide on the line cord connector opening and turn the attendant console rightside up.
- 5     Remove the Light Probe PCB from the filler plate opening on the left side of the attendant console.
  - 6     Insert the filler plate into the opening on the left side of the attendant console.
  - 7     Replace the cover and faceplate on the attendant console and module(s), if equipped.
  - 8     Pack and store the QKM13 Light Probe kit, or return it to the supplier.

#### **Procedure 68**

##### **Installing the QKM13 Light Probe kit in an SL-1 telephone**

- 1     Remove the faceplate and cover from the set and add-on module(s), if equipped.
- 2     Remove the filler plate from the left side of the telephone.
- 3     Insert the Light Probe PCB into the filler plate opening on the left side of the telephone.
- 4     Remove the two wires on terminal REC/HS4 on the set PCB and connect the wires to the connector kit.
- 5     Connect the wire from the connector kit to terminal REC/HS4 on the telephone PCB.
- 6     Connect the S-G lead from the Light Probe PCB to terminal REC/HS4 on the telephone PCB.
- 7     Remove the two wires from terminal VSS on the set PCB and connect the wires to the connector kit.
- 8     Connect the wire from the connector kit to terminal VSS on the set PCB.

**Figure 44**  
**Light Probe PCB connections to an attendant console and SL-1 telephone**



- 9 Connect the S-Y lead from the light probe PCB to terminal VSS on the telephone PCB.
- 10 Plug the Light Probe PCB socket (BL-R lead) into jack J1 in the set or into the extension jack in the last add-on module.
- 11 Replace the cover and faceplate on the telephone and add-on module(s), if equipped.
- 12 Plug the Light Probe cable into the jack on the PCB in the filler plate opening on the left side of the telephone and test it. A tone should be heard only when the probe is over a lit LED.

**Procedure 69**

**Removing the QKM13 Light Probe kit from an SL-1 telephone**

- 1 Unplug the Light Probe cable from the PCB jack in the filler opening on the left side of the telephone.
- 2 Remove the faceplate and cover from the telephone and add-on module(s), if equipped.
- 3 Unplug the Light Probe PCB socket (BL-R lead) from jack J1 in the telephone or from the extension jack in the last add-on module.
- 4 Disconnect Light Probe PCB leads S-Y and S-G from terminals VSS and REC/HS4 on the telephone PCB.
- 5 Disconnect the wire going to the connector kit from terminal VSS on the telephone PCB.
- 6 Disconnect the two wires connected to the opposite end of the connector kit and connect these wires to terminal VSS on the telephone PCB.
- 7 Disconnect the wire going to the connector kit from terminal REC/HS4 on the telephone PCB.
- 8 Disconnect the two wires connected to the opposite end of the connector kit and connect these wires to terminal REC/HS4 on the telephone PCB.
- 9 Remove the Light Probe PCB from the filler plate opening and the connector kits from the telephone.
- 10 Insert the filler plate into the opening on the left side of telephone.
- 11 Replace the cover and faceplate on the telephone and add-on module(s), if equipped.
- 12 Test the telephone to ensure proper operation.
- 13 Pack and store the QKM13 Light Probe kit or return it to the supplier.

## QUT1 power unit and transformer

The QUT1 power unit is designed to supply power for add-on units of up to 11 SL-1 telephones or attendant consoles from a centralized location.

When AC transformers are used to provide auxiliary power to attendant consoles or sets, a separate 25 V and/or 15 V ac transformer is required for each attendant console or telephone.

Figure 45 illustrates the QUT1 power unit faceplate, and Figure 46, the QUT1 power unit connection.

Table 29 gives data on QUT1 power unit fusing, and Table 30 lists the QUT1 connections. Tables 31, 32, and 33 list the allowable distances from the QUT1 to the telephone, the Lamp Field Array module, and the attendant console, respectively.

**Table 29**  
**QUT1 power unit fusing**

Fuse	Use	Type	Rating (A)
F1	117 V ac line	QFF1A	2-1/3
F6-F14	25 V	QFF1G	1/2
F3-F5*	12.5 V	QFF1G	1/2
F3-F5**	12.5 V	QFF1G	1/2
<b>Note:</b> * Z option: F3-F3, F5-F5 in series, 25 V. ** Y option: F3-F3, F5-F5 in parallel, 12.5 V.			

**Table 30**  
**QUT1 connections (Part 1 of 2)**

NE-66 pair	Color	QUT1	Voltage
1	W-BL	FUSE 6	25 V
	BL-W		
2	W-O	FUSE 7	25 V
	O-W		
3	W-G	FUSE 8	25 V
	G-W		
4	W-BR	FUSE 9	25 V
	BR-W		
5	W-S	FUSE 10	25 V
	S-W		
6	R-BL	FUSE 11	25 V
	BL-R		
7	R-O	FUSE 12	25 V
	O-R		
8	R-G	FUSE 13	25 V
	G-R		
9	R-BR	FUSE 14	25 V
	BR-R		
10	R-S	FUSE 2	12.5 V
	S-R		
11	BK-BL	FUSE 3	12.5 V
	BL-BK		
12	BK-O	FUSE 4	12.5 V
	O-BK		
13	BK-G	FUSE 5	12.5 V
	G-BK		



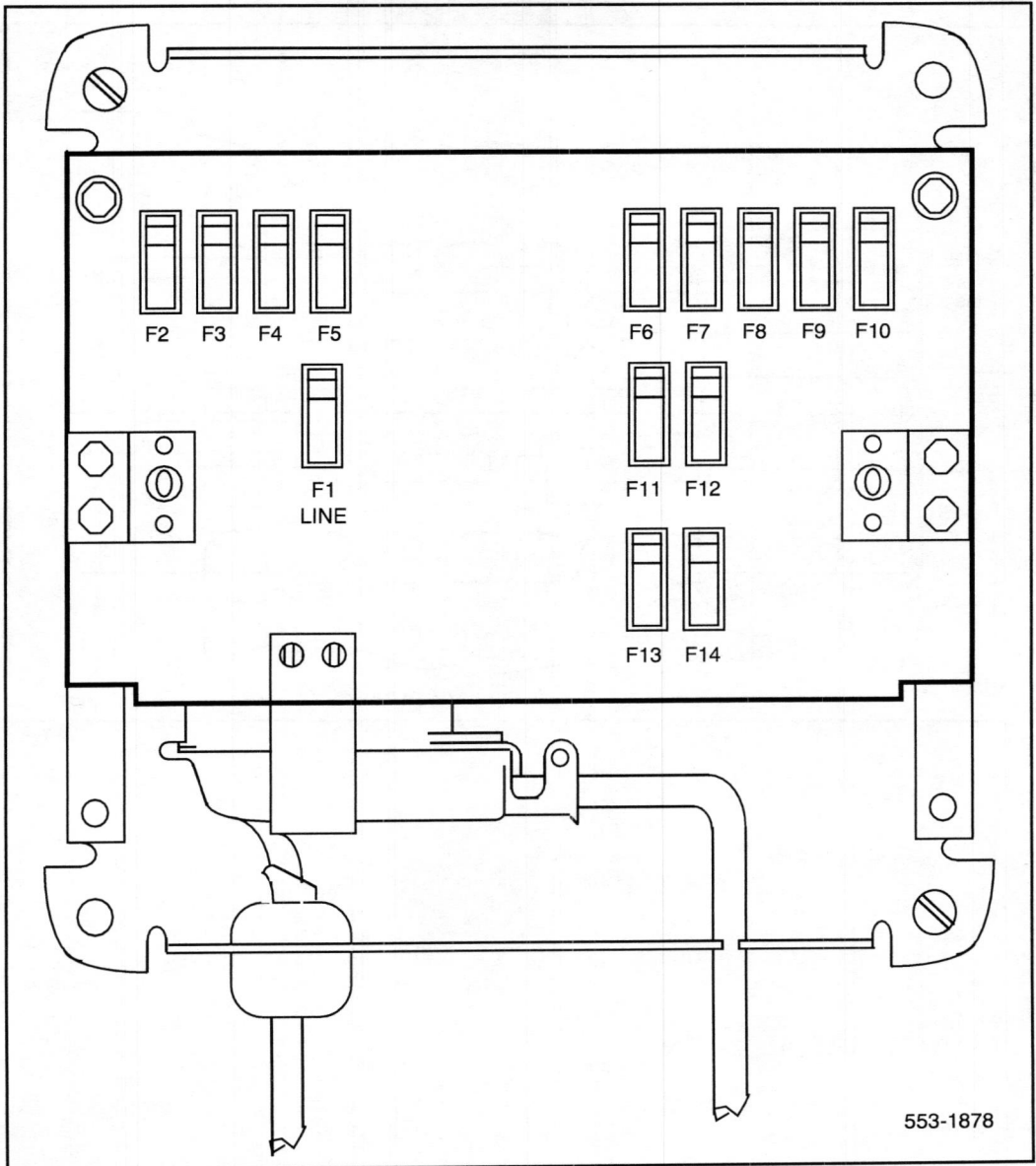
**Table 30**  
**QUT1 connections (Part 2 of 2)**

NE-66 pair	Color	QUT1	Voltage
14	BK-BR	—	—
	BR-BK		
15	BK-S	—	—
	S-BK		
16	Y-BL	—	—
	BL-Y		
17	Y-O	—	—
	O-Y		
18	Y-G	—	—
	G-Y		
19	Y-BR	—	—
	BR-Y		
20	Y-S	—	—
	S-Y		
21	V-BL	—	—
	BL-V		
22	V-O	—	—
	O-V		
23	V-G	—	—
	G-V		
24	V-BR	—	—
	BR-V		
25	V-S	—	—
	S-V		

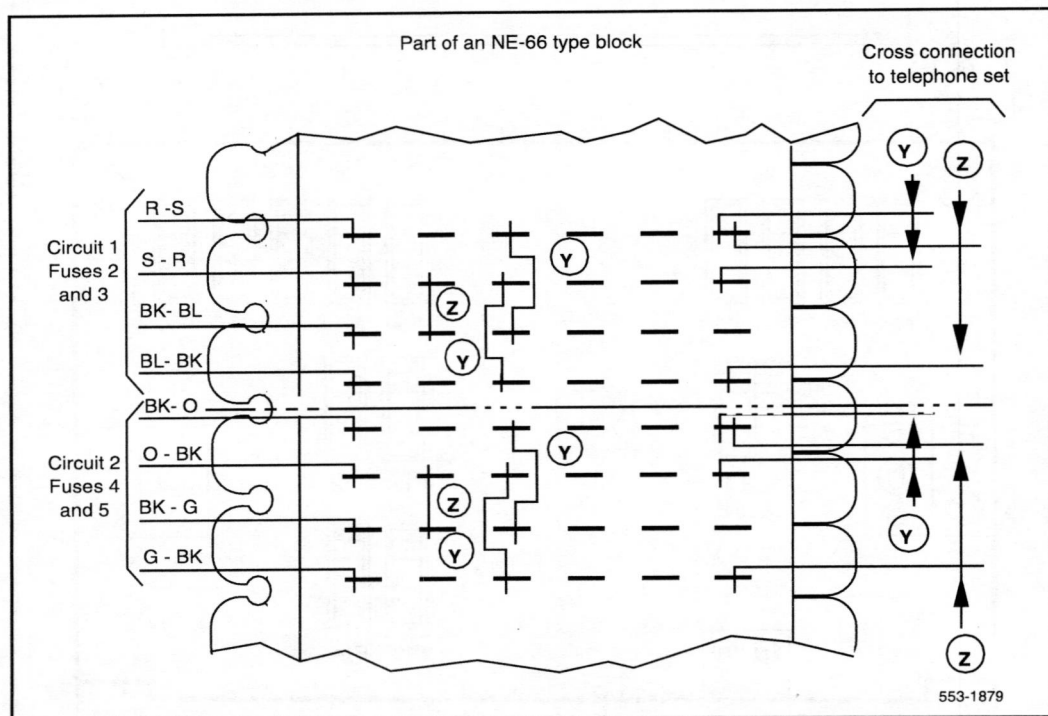
**Procedure 70**  
**Installing the QUT1 power unit**

- 1      Unpack and inspect the QUT1 unit. If it is damaged, repack and return it to your supplier.
- 2      Determine from the work order where to install the power units (equipment room or terminal closet).
- 3      Place the power unit faceup on a flat surface.
- 4      Completely loosen the two screws securing the cover of the unit and remove the cover.
- 5      Remove the two screws, securing the metal backboard to the power unit (at diagonally opposite corners).
- 6      Mount the backboard on a wall within 6 ft (1830 mm) of a 117 V ac electrical outlet.
- 7      Place the power unit on the backboard so that the holes in the back of the power unit engage the hooks on the backboard.
- 8      Secure the power unit to the backboard with the two machine screws previously removed.
- 9      Loosen the two screws securing the connector clamp located on the front (lower left) of the power unit and slide the clamp downward.
- 10     Select an NE-A25B (or equivalent) connector cable of suitable length.
- 11     Insert the connector on the cable into the connector jack on the power unit. Run the cable slightly to the right and then down through the bottom entry hole of the power unit.
- 12     Mount a 25-pair NE-66 (or equivalent) connecting block in the yellow field of the wall-mounted cross-connect terminal or on the horizontal side bottom row of the distributing frame. Designate the connecting block.
- 13     Terminate the end of the cable on the connecting block, following the sequence provided in Figure 46.
- 14     Insert the appropriate fuses (if not provided) in the fuse holders on the power unit, as required.
- 15     Place the cover on the power unit. Secure the cover with the two retaining screws provided with the cover.
- 16     Cross-connect to the attendant console or telephone as required.

**Figure 45**  
**QUT1 power unit faceplate**



**Figure 46**  
**QUT1 power unit connection**



**Procedure 71****Removing the QUT1 power unit**

- 1 Completely loosen the two screws securing the cover of the power unit, and remove the cover.
- 2 Remove the AC plug from the 117 V ac electrical outlet.
- 3 Loosen the two screws securing the connector clamp, located on the front (lower left) of the power unit, and slide the clamp downward.
- 4 Disconnect the connector on the cable from the connector jack on the power unit.
- 5 Remove the two machine screws securing the power unit to the backboard.
- 6 Unhook the power unit from the backboard. Place the unit faceup on a flat surface.
- 7 Remove the screws securing the metal backboard to the wall. Remove the backboard.
- 8 Secure the metal backboard to the removed power unit with the two machine screws previously removed.
- 9 Replace the cover on the power unit, and secure it with mounting screws.
- 10 Remove the 25-pair connector cable running to the cross-connect terminal, if it is no longer required.
- 11 Remove the power cross-connections from the 66-type connecting block to the attendant console or telephone.

**Procedure 72****Installing the transformer**

- 1 Plug a 15 V or 25 V ac transformer into a 115 V ac power outlet located within 25 ft (7620 mm) of the telephone or attendant console.
- 2 Connect and run the 3-wire 24 AWG Z station wire from the transformer to the attendant console or the telephone connecting block.
- 3 Connect the attendant console or telephone.

### Procedure 73 Removing the transformer

- 1 Unplug the 15 V or 25 V ac transformer from the 115 V ac power outlet.
- 2 Disconnect and remove the Z station wire from the transformer and attendant console or telephone connecting block.

**Table 31**  
**Allowable distance from the QUT1 to the telephone**

Telephone equipped with	22 AWG ft (m)	24 AWG ft (m)	26 AWG ft (m)
10 KL module *	11000 (3390)	7150 (2200)	4550 (1400)
20 KL module **	5550 (1710)	3500 (1076)	2200 (677)
10 + 20 KL module	3650 (1120)	2300 (708)	1450 (446)
20 +. 20 KL module	2650 (815)	1700 (524)	1050 (324)
20 +. 20 +KL module	2100 (647)	1300 (400)	850 (262)
HFU + 10 KL module ***	905 (278)	575 (177)	365 (112)
HFU + 20 KL module	755 (232)	480 (148)	320 (98)
HFU + 20 + 10 KL module	650 (200)	410 (126)	260 (80)
HFU + 20 + 20 &pl. 10 KL module	500 (154)	315 (97)	200 (62)
<b>Note:</b> Cable pairs can be doubled to double the allowable distance to the telephone. * 10 KL = 10-button key/lamp. ** 20 KL = 20-button key/lamp. *** HFU = Handsfree unit.			

**Table 32**  
**Allowable distance from the QUT1 to the Lamp Field Array module**

22 AWG ft (m)	24 AWG ft (m)	26 AWG ft (m)
130 (40)	80 (24.6)	50 (15.4)

**Table 33**  
**Allowable distance from the QUT1 to the attendant console**

Equipment	22 AWG	24 AWG	26 AWG
Attendant console	1850 (568)	1200 (369)	750 (231)
Attendant console + LA module	1600 (492)	1000 (308)	650 (200)
Attendant console + 10 KL module	1600 (492)	1000 (308)	650 (200)
Attendant console + 10 KL + LA module	1400 (431)	900 (277)	550 (169)
Attendant console + 20 KL module	1400 (431)	900 (277)	550 (169)
Attendant console + 20 KL + LA module	1250 (385)	800 (246)	500 (154)
<b>Note:</b> The distances given in this table are for the 24-V supply.			



## M2000/M2317/M3000 Data Options

If an existing digital telephone was not originally equipped with the Data Option, or if the existing Data Option has become defective, that option can be added or replaced. The following procedure explains how to install the Data Option for the M2000 series telephones.

### CAUTION

CMOS devices inside the telephone can be damaged by electrostatic discharge. Before opening any M2000 telephone, discharge your hands and tools by touching any grounded metal surface or conductor.

- 1      Remove the handset, and place the telephone upside down on a level workplace (a desktop, for example).
- 2      Disconnect all cords from the telephone.
- 3      Loosen and remove five screws in the base of the telephone, lifting the base upward.
- 4      If the telephone is not equipped with the ADO, proceed with step 5.  
  
         If the telephone is equipped with a defective ADO, carefully disconnect the ribbon cable connector from the header connector in the digital printed circuit board. Loosen and remove the two self-tapping screws that fasten the ADO to the telephone base and remove the defective ADO. Proceed with step 6. See Figure 47.
- 5      Remove the breakout section in the rear of the telephone base by tapping it with the handle of a small screwdriver.
- 6      Place the black plastic connector shroud over the RS-232-C interface connector.  
  
         **Note:** It is not possible to install the shroud after the board has been inserted in the telephone base.
- 7      Tip the circuit board up and insert it, connector end first, under the tabs in the base. Position it over the molded locating pins; then lower the board completely into position in the telephone base. Use the three slotted, self-tapping screws supplied with the board and install them through the mounting holes. Tighten the screws.

- 8 Plug the ribbon cable connector into the header connector, located on the existing circuit board of the telephone (mounted on the faceplate assembly). There is only one such connector on the telephone's circuit board. Make sure the connector is snug.
- 9 In M2112 telephones equipped with Handsfree, make certain that the rubber gasket covering the microphone cavity is firmly in place before closing the case.
- 10 Reassemble the telephone by placing the base section on the faceplate section. Reinstall the five screws.
- 11 Tighten the screws, reconnect all cords, and place the telephone in its former position.
- 12 Refer to Procedures 74 or 75 to connect the power supply and data terminal to the ADO.

#### **Procedure 74**

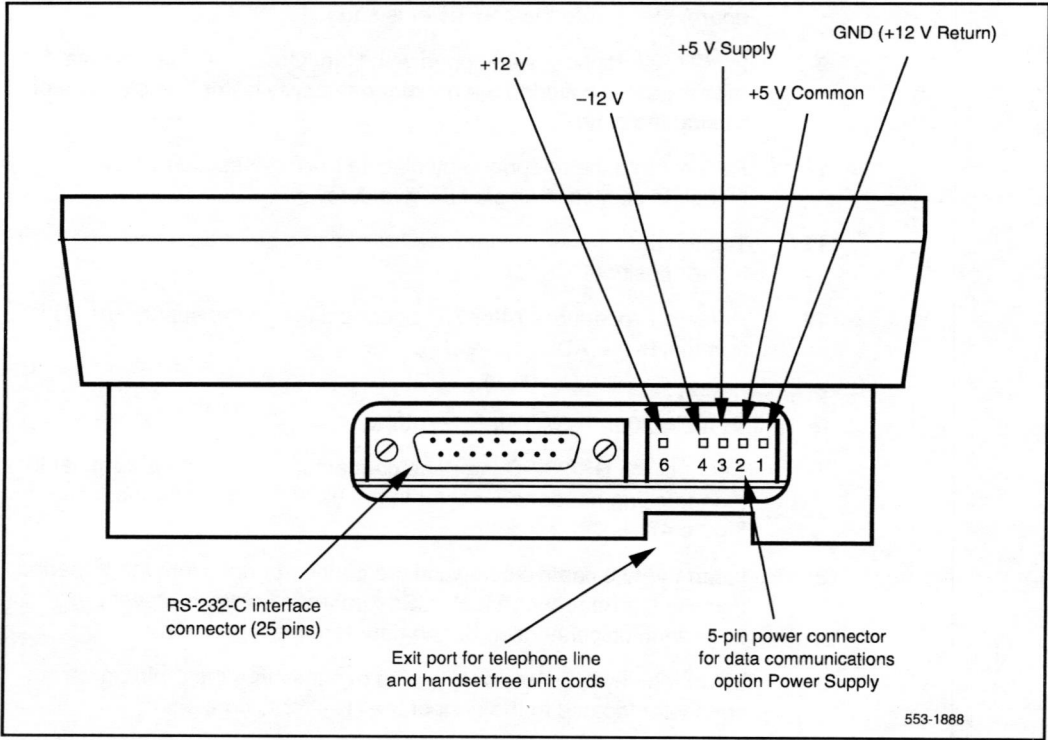
##### **Installing the M2000/M2317 data terminal**

- 1 Connect the RS-232-C interface connector from the data terminal to the matching header connector in the back of the telephone (see Figure 47).
- 2 Insert the two captive screws in the connector body into the threaded holes in the header connector. Secure them tightly to prevent accidental disconnection during data terminal operation.
- 3 Insert the keyed power supply plug securely into the 5-pin power connector located to the right of the RS-232-C connector.
- 4 Plug the wall transformer into the nearest AC outlet. The data terminal is now operational.

**Note 1:** If an ADM3, ADM5, or ADM11 terminal is used in conjunction with the RS-232-C connector in the Asynchronous Data Option, pin 22 in the RS-232-C cable must be disconnected. These ADM terminals will go into test mode if this pin is not disconnected.

**Note 2:** A special 9-pin connector is required to connect the Apple Macintosh to the RS-232-C connector in the M2000 Asynchronous Data Option. The connections are shown in Table 34.

**Figure 47**  
**M2000/M2317 data terminal and Data Option power supply connection**



**Table 34**  
**Connections for the Apple Macintosh to the M2000/M2317**  
**Asynchronous Data Option (ADO)**

9-pin connector (from terminal)		25-pin (RS-232-C) connector (at ADO port)	
Pin 3	to	Pin 7	
Pin 5	to	Pin 2	
Pin 9	to	Pin 3	
<b>Note:</b> Strap pins 4 and 5 and pins 6, 8, and 20 together.			

**Table 35**  
**RS-232-C signals and associated pin numbers for M2317 telephones**

Circuit designation			Pin number	Signal source		
EIA	Common	CCITT		DTE	DCE	Name
AA		101	1		X	Frame ground
BA	TXD	103	2	X		Transmit data
BB	RXD	104	3		X	Receive data
CA	RTS	105	4	X		Request to send
CB	CTS	106	5		X	Clear to send
CC	DSR	107	6		X	Data set ready
AB	GND	102	7	X		Signal ground
CD	DTR	108.2	20	X		Data terminal ready
CE	RI	125	22		X	Ring indicator

**Procedure 75**  
**Installing the M3000 data terminal**

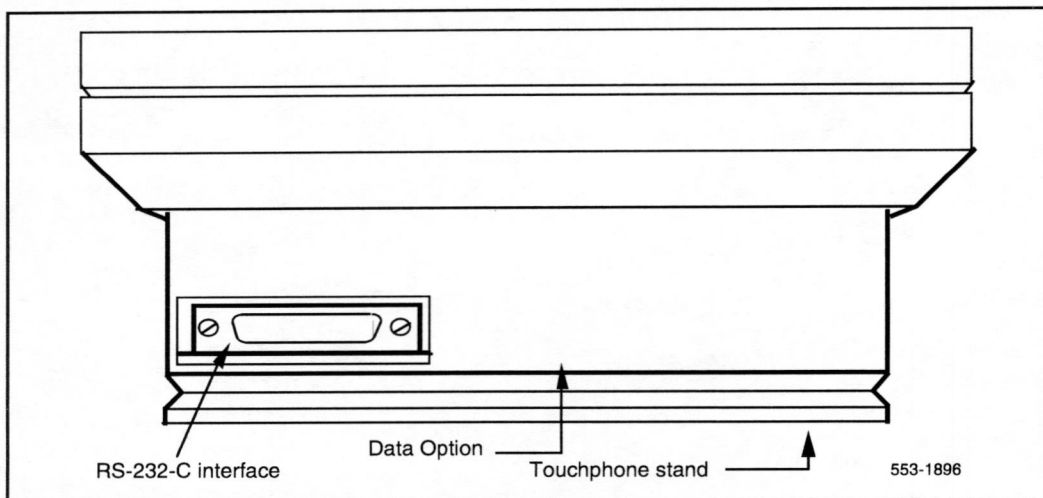
- 1**     Connect the RS-232-C interface connector from the data terminal to the Data Option connector in the back of the M3000 Touchphone set.
- 2**     Insert the two captive screws in the connector body into the threaded holes in the Data Option connector. Secure tightly to prevent accidental disconnection during data terminal operation.
- 3**     Ensure that the Touchphone power supply transformer is plugged in the wall outlet, and connected to the Touchphone.

Figure 48 illustrates the M3000 data terminal and DTE/computer terminal connection.

Table 36 shows the connector pin numbers together with the signals associated with each pin as it applies to the standard RS-232-C interface.

**Note:** If an ADM3, ADM5, or ADM11 terminal is used in conjunction with the RS-232-C connector in the Asynchronous Data Option (ADO), pin 22 in the RS-232-C cable must be disconnected. These ADM terminals will go into test mode if this pin is not disconnected.

**Figure 48**  
**M3000 data terminal and DTE/computer terminal connection**



**Table 36**  
**RS-232-C signals and associated pin numbers for the M3000 Touchphone set**

Circuit designation			Pin number	Signal source		
EIA	Common	CCITT		DTE	DCE	Name
AA		101	1		X	Frame ground
BA	TXD	103	2	X		Transmit data
BB	RXD	104	3		X	Receive data
CA	RTS	105	4	X		Request to send
CB	CTS	106	5		X	Clear to send
CC	DSR	107	6		X	Data set ready
AB	GND	102	7	X		Signal ground
CD	DTR	108.2	20	X		Data terminal ready
CE	RI	125	22		X	Ring indicator

**Note:** A special 9-pin connector is required to connect the Apple Macintosh to the RS-232-C connector in the M3000 Asynchronous Data Option. See Table 37 for the cable connections.

**Table 37**  
**Connections for the Apple Macintosh to the M3000 Data Option**

9-pin connector (from terminal)		25-pin (RS-232-C) connector (at Data Option port)
Pin 3	to	Pin 7
Pin 5	to	Pin 2
Pin 9	to	Pin 3
<b>Note:</b> Strap pins 4 and 5 and pins 6, 8, and 20 together.		

## Meridian Modular Telephones

Use the procedures listed here for adding hardware options to the M2006, M2008/M2008HF, M2016S, M2616, and M2216ACD sets only. These options are available with X11 release 14 and later.

### **CAUTION**

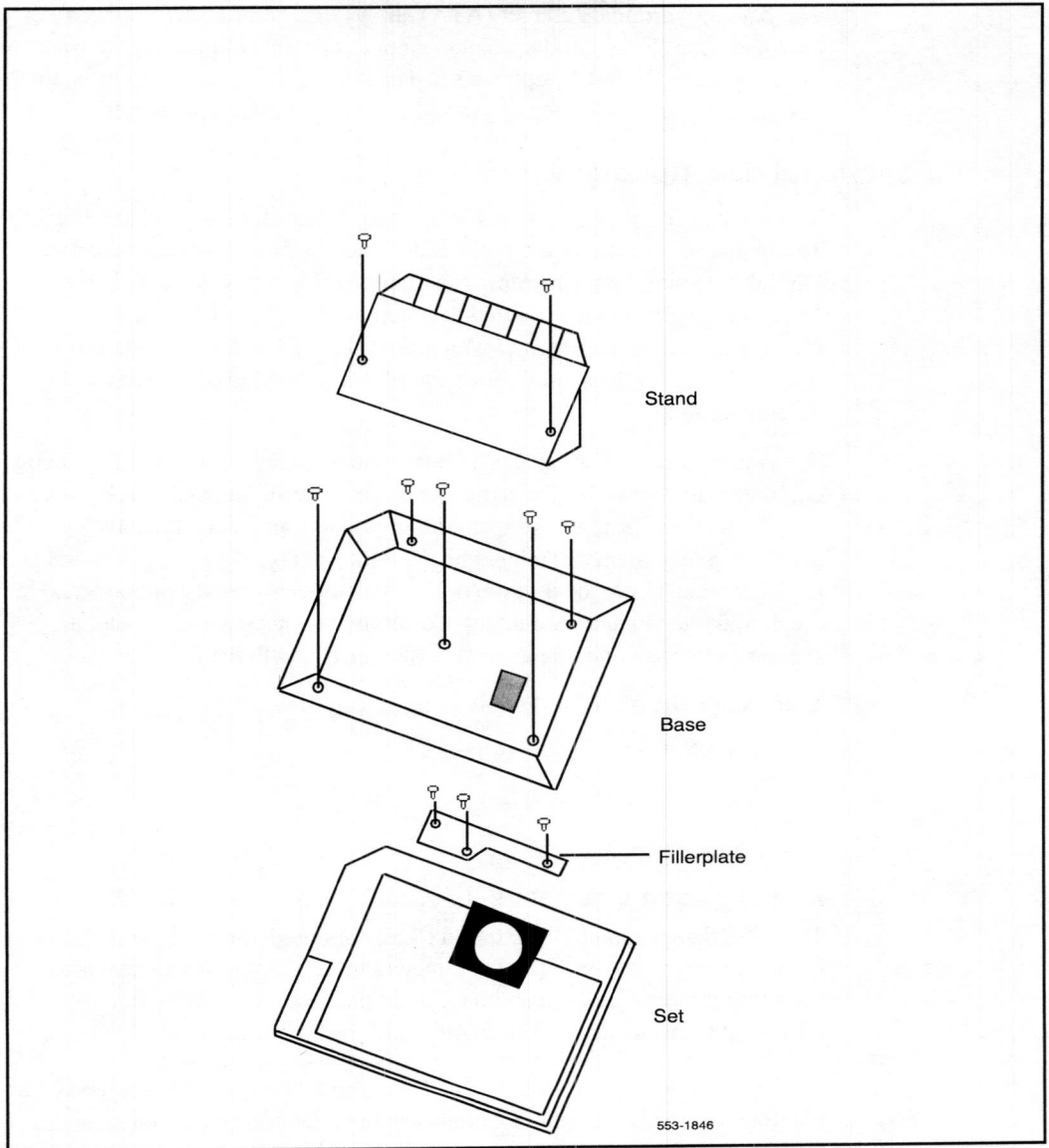
Use only the line cord provided with your Meridian Modular Telephone when installing and removing options. The acceptable line cord is A0346862.

Figure 49 shows an exploded view for reference when dismantling the telephone to get to its internal components. Some telephone types are slightly smaller than the M2616 and do not have the center screw in the base, but otherwise they are the same. The center screw may not be required.

Refer to Figure 51 on page 176 to locate the various components of the M2006 and M2008/M2008HF telephones. Refer to Figure 52 on page 177 to locate components on the M2616, M2016S, and M2216ACD telephones.



**Figure 49**  
**Exploded view of the M2616/M2016S/M2216ACD telephone**



## Analog Terminal Adapter

The Analog Terminal Adapter (ATA) allows the use of an off-the-shelf analog device (FAX, Modem, Telephone) to operate simultaneously with your Meridian Digital Telephone set. The Analog Terminal Adapter board fits into the footstand space of your Meridian Digital Telephone set.

### Functional description

The Analog Terminal Adapter will be compatible with the Meridian Digital Telephone set. It is mounted in the redesigned footstand of your Meridian Digital Telephone set. The Meridian Digital Telephones (M2006/8 and M22/2216) footstand is modified to accommodate the ATA. The ATA requires a separate AC adapter which provides a 24 volt AC external power source. The ATA does not draw power from your Meridian Digital Telephone set.

The Analog Terminal Adapter (ATA) provides a RJ11 connection for analog equipment to operate on the same line as your Meridian Digital Telephone set. The Analog Terminal Adapter allows you to transmit and receive data using the public switched telephone network (PSTN). The ATA supports an analog device link to the desktop or laptop computer users (with modems) in the digital telephone environment. Currently, it is necessary to install a separate analog phone line to be able to interface with the PSTN.

You can use the ATA for the following analog devices:

- FAX Machine
- Modem
- Analog Telephone

### ATA operating parameters

The ATA data parameters are stored locally although the configuration is set in the Meridian 1 system. Data parameters must be set in the system after installing the ATA in the telephone. If the parameters are set before the telephone is installed, the configuration information will be lost.

Simultaneous voice, FAX/modem calls require X11 release 22 equipped with Flexible Voice/Data Terminal Number feature. Overlay 11 is configured in the Meridian 1 system when implementing the Flexible Voice and Data Feature. See the *X11 input/output guide* (553-3001-400) for prompt and response details.

The ATA will not provide simultaneous voice and data if the X11 software release is prior to release 22.

The Analog Terminal Adapter (ATA) is capable of receiving dial pulse or DTMF address signaling from the analog equipment.

The ATA uses the 2nd channel of the TCM loop to add an analog port to the digital terminal. It has an RJ11 type jack accessible from the back of the telset.

The analog interface of the ATA is a 2-wire source, providing A and B leads (tip and ring) across which analog equipment (modem/fax) is connected. The loop length will be >100 feet. The analog interface of the ATA is compatible with the port types listed in Table 38.

**Table 38**  
**Port types compatible with ATA**

Country	Port Type(s)	Defining Standard(s)
United States	ONS Station Interface	EIA/Tia-464A
	Class A OPS Station Interface	FCC Rules Part 68
Canada	ONS Station Interface	CAN3-T512.1
	Class 1300 OPS Station Interface	CS-03 Part I

Refer to *Analog Terminal Adapter Quick Reference card* or *Installing an Analog Terminal Adapter* for detailed information on this feature.

**Procedure 76**  
**Installing and removing the Analog Terminal Adapter**

**CAUTION**

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

Use the following procedures to add the Analog Terminal Adapter (ATA) to the telephone and to connect it to a FAX or modem. The ATA is supported on Meridian Digital Telephones only.

- 1 Flexible voice and data capabilities are available with X11 release 22 or later. When the ATA is installed, the System Administrator must activate the Flexible Voice and Data Feature by configuring Overlay 11.

**Note:** The Flexible Voice and Data Feature is not available on releases prior to 22.

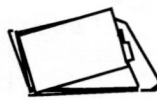
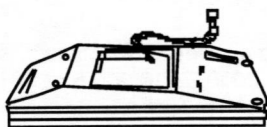
- 2 To Activate the Flexible Voice and Data Feature, use the following chart to configure Overlay 11 (for more detailed information, refer to NTP *X11 input/output guide* (553-3001-400)).

**Table 39:**  
**Flexible Voice and Data feature configuration**

Prompt	Response	Description
REQ	NEW/CHG	New, or change
TYPE	aaaa	Telephone type, where aaaa=2006,2008, 2016, or 2616
TN	Iscu	Terminal Number where u=16-31
CLS	FLXA	Flexible voice/data allowed. This Class of service can only be assigned to 2006, 2008, 2016, 2216 or 2617 sets. When configured to CLS=FLXA
	VCE	(FLXD) = Flexible voice/data denied. Voice Class of Service (VCE) can be assigned to the upper TN unit (16-31) and Data class of Service (DTA) can be assigned to the lower TN (0-15). A Single Call Ringing (SCR) key can be designated a Data Mode (DTNK) key.
KEY		Prime Directory Number Key, SCR, SCN, MCR or MCN and xxx.
-Key	xxSCRyyyy	Single Call Ringing
	xxSCNyyyy	Single Call Non Ringing Data Mode Key, where xx=key number and yyy=Data Directory Number.

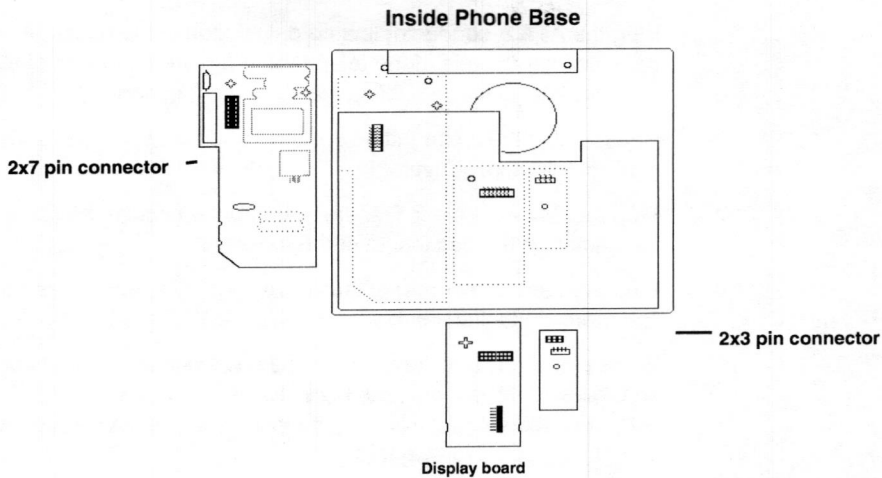
- 3 Disconnect and remove all cords (including the handset cord) from the telephone.
- 4 Place the telephone, face-down, on a padded level surface.
- 5 Using a #1 Phillips screw driver, remove both screws and separate the footstand from the phone base.
- 6 If you have the NT9K ATA ready set or the NT2K with date code of January 1998 or later:
- Remove and retain the footstand (you will reattach this footstand back onto the set base after ATA installation is complete).
  - Skip to the ATA Installation Procedure 13 on page 165.

- 7 If you have the NT2K or the NTZK phone set, remove and discard the footstand (you will use the redesigned footstand required for the installation of the ATA).
- 8 If you have an MCA or MPDA installed, unplug it from the data line jack in the phone base.
- 9 Remove the back covering of the phone base by removing the four screws.



Footstand

- 10 If the phone is equipped with a Power Option board and/or cable, you must remove it before installing the ATA. The Power Option board is located on the left side of the telephone):
  - Remove the two small screws from the Power Option board (near the top) and set them aside.
  - To disconnect the Power Option board from the **NTZK** telephone, grasp the board firmly on each side and slowly rock the Power Option board while applying upward pressure until it is released from the 2X7 pin connector.
  - To disconnect the **NT2K** Power Option board from the set simply remove the screws from the Power Option board and base and lift the board out of the set.
  - If the Power Option board has a ribbon cable, disconnect the cable from the 2X7pin connector on the main board and remove the cable



- 11 If the phone is equipped with the External Alarmer Option, you must remove it before installing the ATA. The External Alarmer Option board is located at the right center of the telephone:
  - Remove the screws from the External Alarmer Option board.
  - Grasp the board firmly on each end and pull upward to remove from the 2X3 pin connector
- 12 Install the Jumper board on the 2X7 pin connector inside the phone set base.
  - There are 2 Jumper boards provided. Use the brown Jumper board for the NTZKxxxx phone set and the black Jumper board for the NT2Kxxxx phone set with a date code prior to January 1998.
  - If a Power Option board was not installed on the NT2Kxxxx and the NTZKxxxx there will be 2 Jumper plugs on the 2X7 pin connector that must be removed before installing the Jumper board.
- 13 Remove the knockout located on the back panel of the footstand in order to install the ATA. It is the smaller knockout, located inside the large knockout. The small ATA knockout can be removed by pressing it in with thumb presser.



- 14 Install the ATA Printed Circuit board into the footstand.
- 15 Plug the ATA 8-conductor line cord, included in the package, into the data jack in the base of the telephone. Plug the other end of this cord into the data jack of the ATA located in the footstand.
- 16 Reassemble the footstand on the base and screw it into position using a #1 Phillips screwdriver.
- 17 Plug the 24v AC Power Transformer into the circular mini DIN connector on the backpanel of the footstand.
- 18 Plug the transformer end of the AC Power Transformer into the AC commercial electrical outlet.
- 19 You are now ready to connect the analog device to the RJ11 connector on the back of the footstand. Refer to the manufacturer's documentation for installation instructions for the FAX, modem or telephone you have selected

## **Meridian Communications Adapter and Meridian Programmable Data Adapter**

The Meridian Communications Adapter (MCA) mounts within the telephone and allows asynchronous and synchronous ASCII terminals, and personal computers to be connected to the telephone using an RS-232C or V.35 interface on a DB-25 connector. The MCA replaces the Meridian Programmable Data Adapter (MPDA). With X11 release 18 and later, data programming can be implemented on the MCA through a service change (LD11) as well as the keypad. With X11 releases 14 through 17 support data commands on the keypad only.

Use the following procedures to add the Meridian Communications Adapter (MCA) or Meridian Programmable Data Adapter (MPDA) to the telephone and to connect it to your terminal or personal computer.

**Note:** The Meridian Programmable Data Adapter is supported by X11 releases 14 through 17. The Meridian Communications Adapter is supported by X11 release 14 and later.

When using the MCA for synchronous data connections, configure the telephone with a display option to view the data parameters. The MPDA and MCA are supported on Meridian Digital Telephones only.

When installing an MCA or MPDA to NTZK or NT2K phone sets with date code prior to January 1998 requires the installation of a Power Option board along with an additional power source.

When installing an MCA in an NT9K phone set or an NT2K with date code of January 1998 you will only install the MCA (an additional Power Option board and Jumper board is not required).

- See Procedure 79 on page 174 for M2006/M2008 NTZK sets.
- See Procedure 80 on page 178 for M2616/M2216ACD NTZK sets.
- See Procedure 81 on page 182 for M2006/M2008/M2008HF NT2K sets.
- See Procedure 76 on page 162 for installing an MCA onto an NT9K or NT2K with date code of January 1998.

The MCA can be placed as far from its associated data terminal or computer port as is consistent with EIA RS-232 or V.35.

When the MCA is used as a V.35 interface, an additional cable is required to convert the DB-25 into a 34-pin rectangular connector. This does not apply to asynchronous configurations. If the pins are left in V.35 mode, asynchronous operation is not supported, and the MCA looks as though it is locked up.

Remove the two 14-pin jumper plugs or one 20-pin jumper plug inside the MCA from the RS-232 socket(s) and install the V.35 socket.

**Note:** The female cable ordering code is A0408927. The male cable ordering code is A0408928. The A0300752 and A0300753 cables are still supported, unless used with applications similar to IBM front-end.

Modem pooling is not supported on the MCA.

When a call is connected between two MCAs, and power is removed from one, the MCA does not release until the power is restored.

The MCA always remembers the most recent data parameters. In the case of power failure, you do not have to reset any data settings.

See Table 40 for a listing of the V.35 CCITT signals supported by the MCA.

Table 40

## V.35 CCITT signals supported by the MCA (Part 1 of 2)

V.35 CCITT	MCA DB-25 pin no.	Abbr.	Adaptor cable		Signal Source		Description
			DB-25 Pin No.	V.35 Pin No.	DTE	MCA	
101	1	DG	1	A			Protective ground*
103A	2	SDA	2	P	X		Transmit data A
104A	3	RDA	3	R		X	Receive data A
105	4	RTS	4	C	X		Request to send
106	5	CTS	5	D		X	Clear to send
107	6	DSR	6	E		X	Data set ready
102	7	S	7	B			Signal ground
109	8	CD	8	F		X	Carrier detect
—	9/10	—	9/10	CC/L			No connection
—	11	—	11	K	X		**
115B	12	SCRB	12	X		X	Serial clock receive B
103B	13	SDB	13	S	X		Transmit data B
114B	14	SCTB	14	AA		X	Serial clock transmit B
<b>Note:</b> * Pin 1 is connected to the MCDS shelf frame. ** These leads are ignored by the MCA controller.							

**Table 40**  
**V.35 CCITT signals supported by the MCA (Part 2 of 2)**

V.35 CCITT	MCA DB-25 pin no.	Abbr.	Adaptor cable		Signal Source		Description
			DB-25 Pin No.	V.35 Pin No.	DTE	MCA	
114A	15	SCTA	15	Y		X	Serial clock transmit A
104B	16	RDB	16	T		X	Receive data B
115A	17	SCRA	17	V		X	Serial clock receive A
—	18/19	—	18/19	M/HH			No connection
108.2	20	DTR	20	H	X		Data terminal ready
—	21	—	21	EE			No connection
125	22	RI	22	J		X	Ring indicator
113B	23	SCTEB	23	W	X		Tran sign elemt time B
113A	24	SCTEA	24	U	X		Tran sign elemt time A
—	25	—	25	MM	X		**
<b>Note:</b> * Pin 1 is connected to the MCDS shelf frame. ** These leads are ignored by the MCA controller.							

**Procedure 77**

**Installing and removing the Meridian Communications Adapter or Meridian Programmable Data Adapter**

**CAUTION**

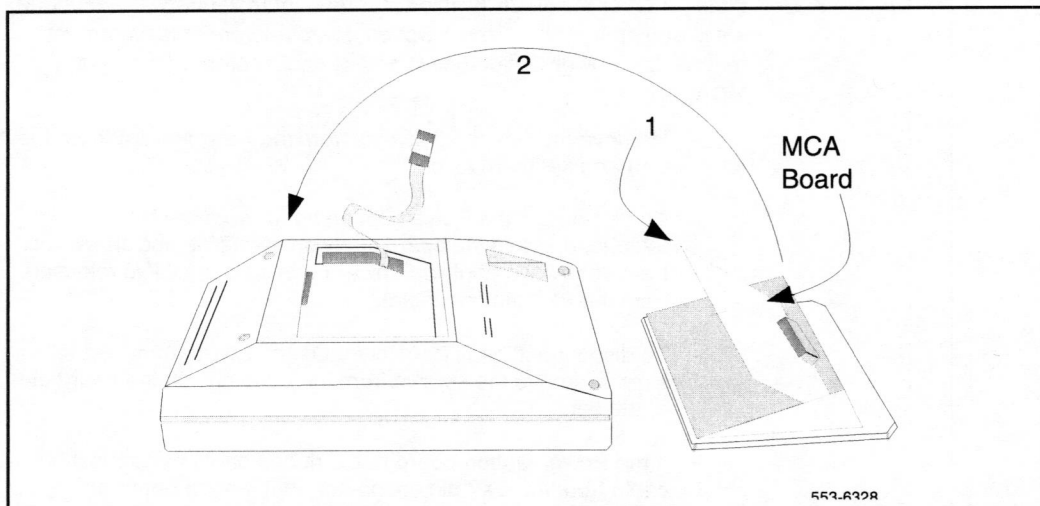
Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

If you have a NT9K phone or the NT2K with date code of January 1998 you do not need to install a Power Option board to operate the MCA.

- 1 Remove the handset and place the telephone upside down on top of a level, solid work surface (a desktop, for example) covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2 Disconnect all cords from the telephone.
- 3 Remove the footstand.
  - For NT2K and NT2K with date code prior to January 1998 remove the two screws from the footstand assembly and unsnap the footstand by pressing inward at the back of the footstand where it meets the base and pull upward. Discard the footstand you will be using the redesigned footstand ordered with your ATA.
  - For NT9K and NT2K with date codes of January 1998 retain the footstand, skip to Procedure 10 on page 171.
- 4 If the telephone is not equipped with the Meridian Programmable Data Adapter (MPDA) or Meridian Communications Adapter (MCA), go to Procedure 6 on page 171. If you wish to replace an existing MPDA or MCA, carefully disconnect the end of the 8-pin TELADAPT jack plugged into the telephone by pressing firmly on the latch-tab and slowly lifting up.
- 5 Turn the telephone footstand assembly over and put it in the normal use position. Remove the two self-tapping screws that fasten the MPDA or MCA to the telephone footstand assembly and remove the MPDA or MCA by pulling outward and up. Go to Procedure 11 on page 172 to replace the MPDA or MCA.

- 6 Remove the back covering of the phone base by removing the four screws.
- 7 If the NTZK or the NT2K (with date code prior to January 1998) phone set is equipped with a Power Option board and/or cable, you must remove the Power Option board and/or cable before installing the MCA.
  - Remove the two small screws from the Power board (near the top) and set them aside.
  - To disconnect the Power Option board from the NTZK telephone, grasp the board firmly on each side and slowly rock the board while applying upward pressure, until it is released from the 2X7 pin connector.
  - To disconnect the NT2K Power Option board from the set, simply remove the screws from the base and lift the board out of the set.
  - If the Power Option board has a ribbon cable disconnect the cable from the 2X7 pin connector on the main board and remove the cable.
- 8 If the phone is equipped with the External Alerter board, you must remove it before installing the MCA with redesigned footstand.
  - The External Alerter board is located at the right center of the telephone.
  - Remove the screws from the board, grasp the board firmly on each end and pull upward to remove it from the 2X3 pin connector.
- 9 Install the Jumper board onto the 2X7 pin connector inside the phone base.
  - If the phone set did not have a Power Option board installed on the NT2K or the NTZK then there will be 2 Jumper plugs on the 2X7 connector. Remove them before installing the Jumper board.
  - The redesigned footstand will have 2 jumpers. Use the black one for the NT2K phone and the brown one for the NTZK phone.
- 10 Remove the large MCA knockout section in the rear of the telephone footstand assembly, and remove the small tabs. It is best to remove this knockout with a screwdriver.

**Figure 50**  
**Installing the MCA**



- 11** For MCA, set option plugs to the required configuration, RS-232 or V.35. The factory default is RS-232.
- 12** Tilt the MPDA or MCA circuit board up and insert the DB-25 connector socket into the breakout section. Then slide the board connector end-first under the tabs in the footstand assembly and position it over the locating pins. Position and lower it completely onto the telephone footstand assembly. Insert the two self-tapping Phillips-head screws supplied with the MPDA or MCA into the mounting holes and tighten them with a #1 Phillips screwdriver.
- 13** Plug one end of an 8-conductor line cord supplied with a TELADAPT adapter in the jack J1 of the MPDA or MCA (latch tab facing down) and plug the other end of the line cord into the data jack in the base of the modular telephone. Make certain the latch tab of each cable end is firmly snapped into place.
- 14** Carefully route the excess cable so that it will not become pinched between the footstand and base.
- 15** Reassemble the base and footstand assembly sections, ensuring that the footstand is firmly seated on the base.



**16** Tighten the screws

- Reconnect all cords, connect the new 24v AC transformer to the set.
- Plug in the new transformer into the 110v AC commercial electrical outlet.
- Place the telephone in the normal operating position.

**Note 1:** Place the label supplied with the MPDA or MCA on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.

**Note 2:** If an ADM3, ADM5, or ADM11 terminal is used in conjunction with the DB-25 connector-C interface connector in the Asynchronous Programmable Data Adapter, pin 22 in the DB-25 connector cable must be disconnected. These ADM terminals will go into test mode if this pin is not disconnected.

**Procedure 78**  
**Connecting the data terminal**

- 1** Connect the DB-25 connector-C interface connector from the data terminal to the matching header connector in the back of the modular telephone.
- 2** Insert the two captive screws in the connector body into the threaded holes in the header connector and secure tightly to prevent accidental disconnection during data terminal operation.

## Power Supply Board (NTZK models)

Use the following procedures to add a Power Supply Board to the telephone for connection to a transformer or closet power supply. Procedure 79 is for the M2006 and M2008. Procedure 80 is for the M2616, and M2216ACD.

### Procedure 79

#### Installing and removing the M2006/M2008

#### Power Supply Board on NTZK sets

#### CAUTION

Connect the optional Power Supply to your Meridian Modular Telephone only. Equipment damage may result from incorrect connections. Both the closet power supply and the transformer are for use with the Meridian Modular Telephone only.

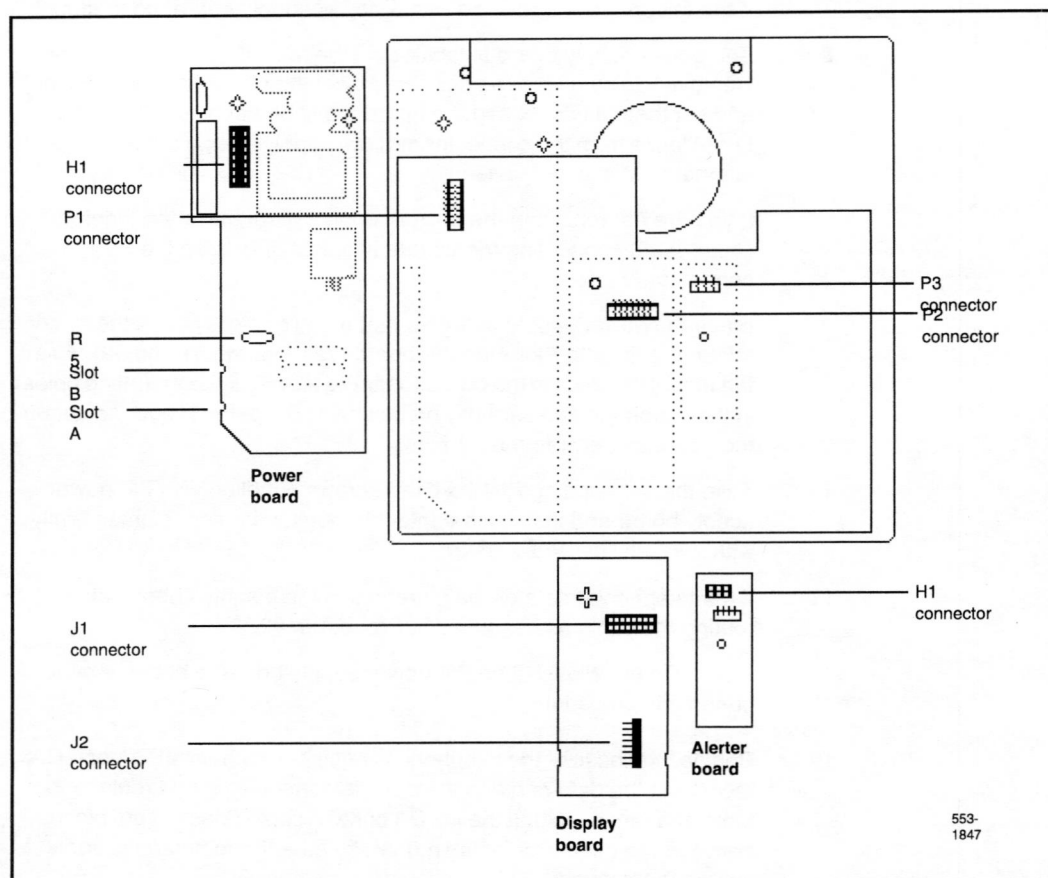
#### CAUTION

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

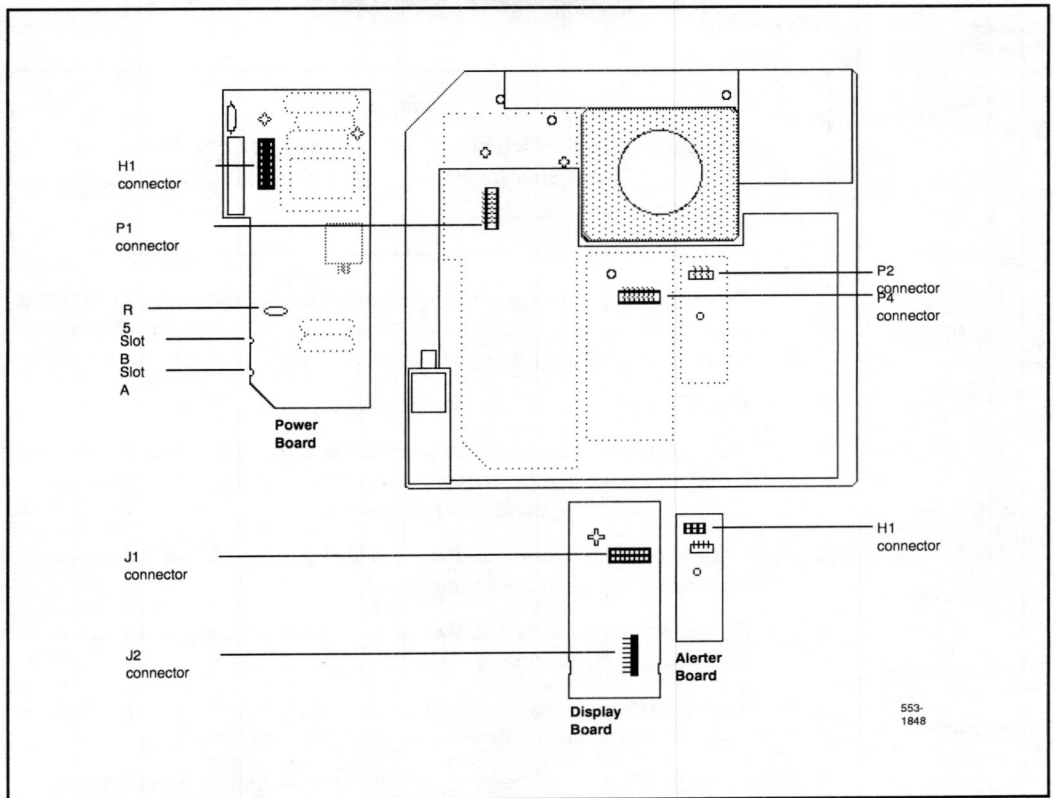
- 1 Remove the handset and place the telephone upside down on top of a level, solid work surface (such as a desktop) covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2 Disconnect all cords from the telephone.
- 3 Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 4 If the telephone is equipped with a Meridian Programmable Data Adapter (MPDA) or Meridian Communications Adapter (MCA), unplug the data cable from telephone's base jack.
- 5 Remove the four screws securing the base of the telephone to the top cover. Remove the base and set it aside.
- 6 If the telephone is equipped with a display, disconnect the display ribbon cable from the display board and move it out of the way.

- 7 If the telephone is not equipped with the power supply board, remove the jumpers from P1 connector pins on the main board. Go to step 9.  
If the telephone is equipped with a power supply board, go to step 8.
- 8 The power supply board is located on the left side of the telephone. Remove two small screws from the power supply board (near the top) and set them aside. Grasp the board firmly on each side. Work the board loose from the connector by slowly applying upward pressure to alternate sides until released.  
  
If you are not replacing the power supply board, place the jumpers (A0288529) connecting the bottom two sets of pins on the P1 connector.
- 9 Place the power supply board so that the alignment pin on the telephone fits into Slot A on the board (see Figures 51 and 52). Align the mounting holes in the board (near the top) over the mounting holes in the telephone and carefully press down so that the H1 connector on the board slides onto the P1 pins.
- 10 Take the self-tapping Phillips-head screws supplied with the power supply board and install them into the mounting holes. Tighten firmly with a #1 Phillips screwdriver.
- 11 If the telephone has a display, reconnect the display ribbon cable, routing the cable as described in Procedure 82.  
  
**Note:** Do not allow R5 on the power supply board to become bent during this procedure.
- 12 Replace the base. If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack and replace the footstand (ensuring that the MPDA or MCA cable does not get pinched between the base and footstand). Make sure the footstand is firmly seated to the base.  
  
**Note:** Place the label supplied with the power supply board on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.
- 13 Tighten all screws, reconnect the line cord, and place the telephone in the normal operating position.

**Figure 51**  
**M2006/2008 telephone and option boards**



**Figure 52**  
**M2616/M2216ACD telephone and option boards**



**Procedure 80**  
**Installing and removing the M2616/M2216ACD Power Supply Board on NTZK sets**

**CAUTION**

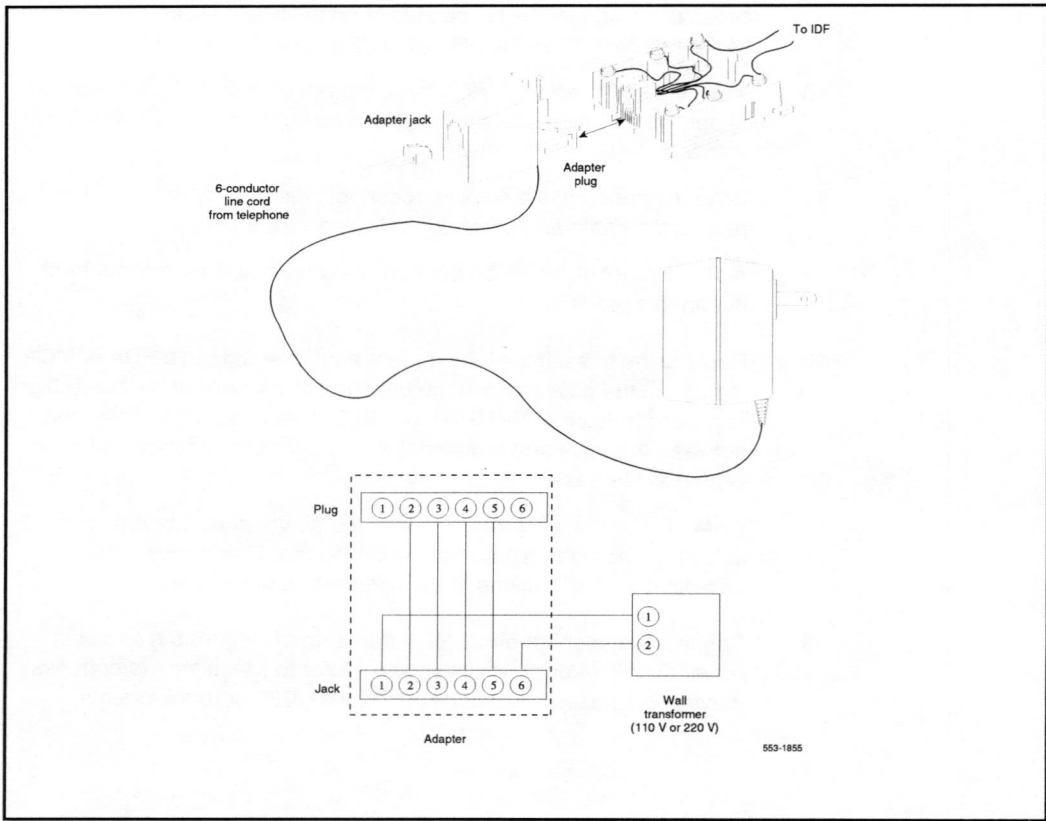
Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1**     Remove the handset and place the telephone upside down on top of a level, solid work surface (such as a desktop) covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2**     Disconnect all cords from the telephone.
- 3**     Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 4**     If the telephone is equipped with an MPDA or MCA, unplug the data cable from the base telephone jack.
- 5**     Remove the four or five screws securing the base to the top cover. Remove the base and set it aside.
- 6**     If the telephone is equipped with display, disconnect the Display ribbon cable from the display board and move it out of the way.
- 7**     If the telephone is not equipped with a power supply board, remove jumpers from the P1 connector pins on the main board. Go to step 9.  
If the telephone is equipped with a power supply board, go to step 8.
- 8**     The power supply board is located on the left side of the telephone. Remove two small screws from the power supply board (near the top) and set them aside. Grasp the board firmly on each side. Work the board loose slowly until it is released.  
  
If you are not replacing the power supply board, place the jumpers (A0288529) connecting the bottom two sets of the pins on the P1 connector.

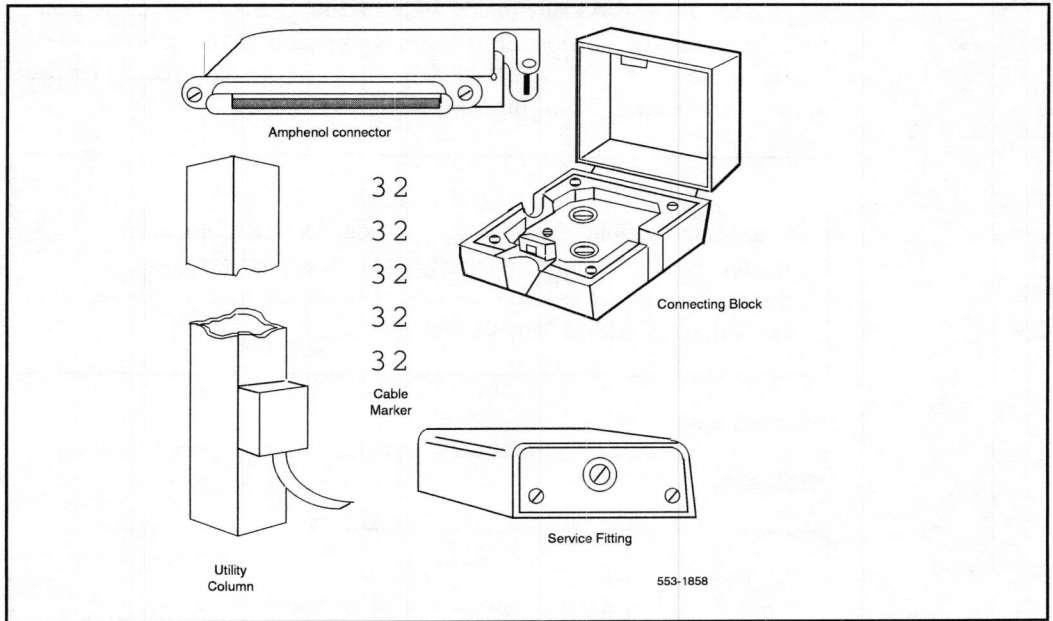
- 9 Place the power supply board so that Slot B fits into the alignment pin on the telephone (see Figure 52). Align the mounting holes in the board (near the top) over mounting holes in the telephone and carefully press down so that the H1 connector on the board slides onto the pins of the header (P1 on the M2616 or J2 on the M2006/M2008).
- 10 Take the self-tapping Phillips-head screws supplied with the power supply board and install them into the mounting holes. Tighten firmly with a #1 Phillips screwdriver.
- 11 If the telephone has a display, reconnect the display ribbon cable, routing the cable as described in Procedure 83.  
**Note:** Do not allow R5 on the power supply board to become bent during this procedure.
- 12 Replace the base. If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack and replace the footstand (ensuring the MPDA or MCA cable does not get pinched between the base and footstand). Make sure the footstand is firmly seated to the base.  
**Note:** Place the label supplied with the power supply board on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.
- 13 Connect the telephone to a local transformer (Figure 53) or closet power supply (Figure 54) as shown. Refer to *Meridian 1 telephones description and specifications* (553-3001-108) for requirements.



**Figure 53**  
**Configuration of a local plug-in transformer**



**Figure 54**  
**Closet power supply configuration**



## Power Supply Board (NT2K models)

Use the following procedure to add a Power Supply Board to the telephone for connection to a transformer or closet power supply. This procedure applies to the M2006, M2008/M2008HF, M2216ACD and M2616 Meridian Modular telephones, NT2K models.

### CAUTION

Connect the optional Power Supply to your Meridian Modular Telephone only. Equipment damage may result from incorrect connections. Both the closet power supply and the transformer are for use with the Meridian Modular Telephone only.

### Procedure 81

#### Installing and removing the M2006 or M2008 Power Supply Board on NT2K sets

### CAUTION

Before handling internal components of telephones, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

### Opening the Telephone

- 1 Disconnect and remove all cords (including the handset) from the telephone.
- 2 Place the telephone, upside-down, on a padded, level surface.
- 3 If your set does not have an MCA or MPDA adapter, go to step 7.
- 4 Using a #1 Phillips screwdriver, remove both screws from the footstand.
- 5 Remove the footstand from the base by pressing in the back of the footstand as you lift it from the base.
- 6 Unplug the MCA or MPDA from the data line jack on the base, and set the footstand aside.
- 7 Remove all screws on the base of the telephone.

- 8** Remove the base from the telephone.

### **Attaching the Power Module**

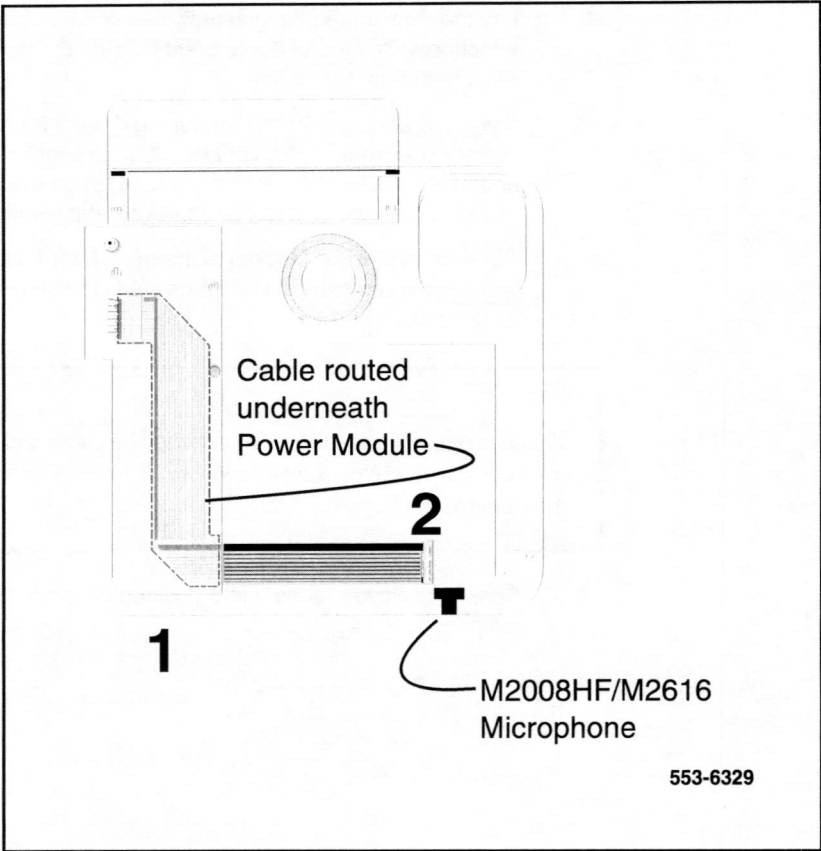
- 9** Lay the Power Module assembly into position on the left side of the telephone. Be careful not to bend R5 (the big disk) on the Power Module during installation.
- 10** If you are adding a Power Module to the set for the first time (not replacing an existing Power Module), the connector (J2 on the M2006 and M2008/M2008HF, P1 on the M2616) on the main board should have jumpers which must be removed at this point.
- 11** Connect the Power Module to the main board with the ribbon cable, keeping the red edge of the ribbon cable from the front of the telephone as show in Figure 55.

#### **CAUTION**

This is a polarity-sensitive connection. The cable and the connector on the main board (J2 on the M2006 and M2008/M2008HF, and P1 on the M2616) are keyed.

- 12** Screw the Power Module into position on the left side of the telephone.

**Figure 55**  
**Ribbon cable placement**



**Reattaching the Base**

- 13**    Make sure that all ribbon cables are lying flat and not caught on any posts on the telephone cover or base.

**CAUTION**

For the M2616 and M2008HF, check that the microphone has not been moved from its black rubber holder, which in turn should be seated in the main board near the ribbon cable you've just attached.

- 14 Replace the base.
- 15 Insert all screws and tighten them.
- 16 If the telephone has an MCA or MPDA, plug its cable into the jack on the telephone base.
- 17 Install the footstand, and secure with two screws.
- 18 Reconnect all cords, including the handset.

**Note:** Place the label supplied with the power supply board on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.

## Installing Displays

The following procedures cover installation of the various displays on the various sets.

- 1 Installing NT2K24WA or NT2K25YL displays on NTZK sets.
  - M2008—Use Procedure 82 on page 186.
  - M2616 or M2216ACD—Use Procedure 83 on page 189.
- 2 Installing NT2K28AA displays on NTZK or NT2K sets.
  - Use Procedure 84 on page 192.
- 3 Installing NT2K24WA or NT2K25YL displays on NT2K sets.
  - M2008—Use Procedure 85 on page 197.

## **Installing NT2K24WA or NT2K25YL displays on NTZK sets**

To install the display on an M2008 set, use Procedure 82. To install the display on an M2616 or M2216ACD set, use Procedure 83 on page 189.

### **Procedure 82**

#### **Installing and removing the M2008 Display on NTZK sets**

##### **CAUTION**

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1** Remove the handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2** Disconnect all cords from the telephone.
- 3** Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 4** If the telephone is equipped with an MPDA or MCA, unplug the data cable from the base telephone jack. Remove the four screws securing the base to the telephone. Remove the base and set it aside.
- 5** The power supply board (if equipped) is located on the left side of the telephone. Remove the two small screws from the power supply board (near the top) and set aside. Grasp the board firmly on each side. Carefully work the board loose until it is released.
- 6** If the telephone is not equipped with a display, go to step 9. If the telephone is equipped with a display, go to step 7.

#### **Removing the display board**

- 7** The display board is located at the left center of the telephone. Disconnect the display ribbon cable from the display board. Remove the small screw from the board. Grasp the board firmly on each end and pull upward to remove. To replace, go to step 9.



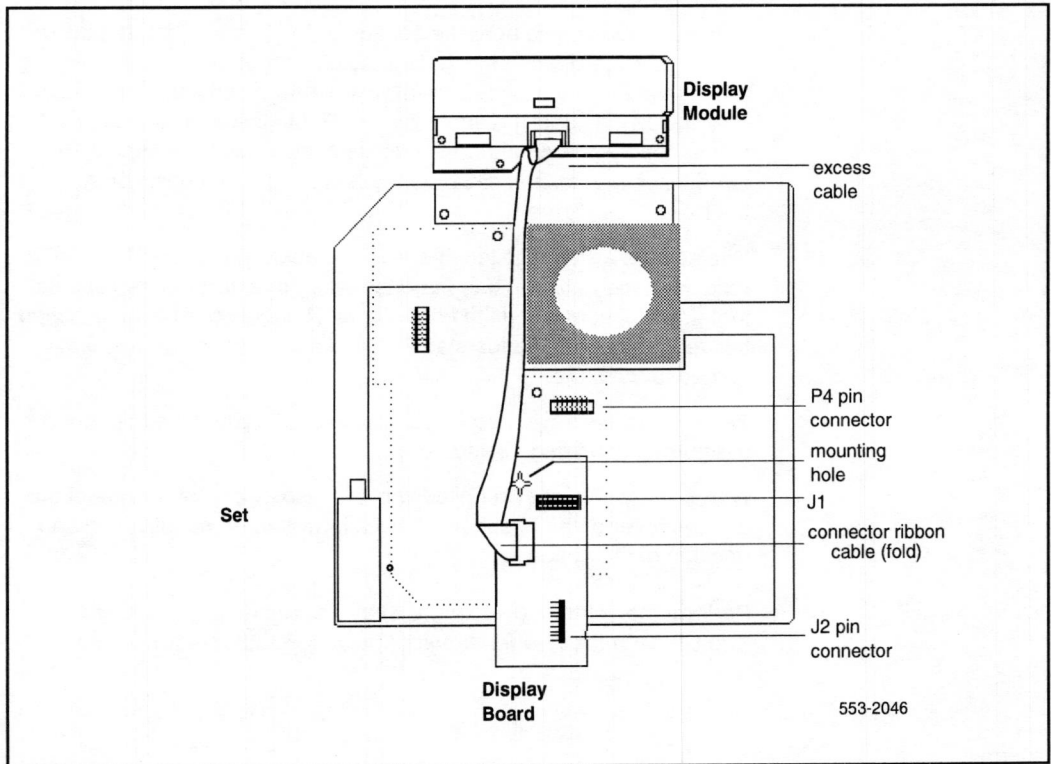
**Removing the display**

- 8 Remove the two or three screws from the display module. Remove the display from the telephone. To install the display option, go to step 11.

**Installing the display board**

- 9 Place the J1 connector of the display board over the P2 pins of the telephone (see Figure 57). Press down slowly until J1 slides onto the P2 pins and is firmly seated.

**Figure 56**  
**Display cable routing**



- 10 Insert the self-tapping Phillips-head screw supplied with the display into the mounting hole (near the top). Tighten it firmly with a #1 Phillips screwdriver.

### Installing the display

- 11 Place the display facedown near the top of telephone and align the two mounting holes of the display with the two mounting holes of the telephone.
- 12 Insert two self-tapping Phillips-head screws from the faceplate into the mounting holes; tighten them firmly with a #1 Phillips screwdriver.  
**Note:** Do not allow R5 on the power supply board to become bent during this procedure.
- 13 Install the power supply board (see Procedure 79).
- 14 Fold the ribbon cable near the connector to align with the J2 pins on the display board, ensuring that the notch on the ribbon cable is facing toward the display board. Carefully work the ribbon cable connector onto the J2 pins until it is firmly seated. Route the cable flat beside the power supply board, gathering excess cable under the display. Be careful not to press the cable beneath the alignment posts or studs of the base. See Figure 57.
- 15 Replace the base. If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack and replace the footstand (ensuring that the MPDA or MCA cable does not get pinched between the base and footstand). Make sure the footstand is firmly seated to the base.
- 16 Tighten all the screws, reconnect all cords, and place the telephone in the normal operating position.  
**Note:** Place the label supplied with the display on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.
- 17 Perform the self-test (Procedure 6) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400).

**Procedure 83****Installing and removing the M2616/M2216ACD Display on NTZK sets****CAUTION**

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1 Remove the handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2 Disconnect all cords from the telephone.
- 3 Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 4 If the telephone is equipped with an MPDA or MCA, unplug the data cable from the base telephone jack. Remove the five screws securing the base to the telephone. Remove the base and set it aside.
- 5 If the telephone is not equipped with a display, go to step 9. If the telephone is equipped with a display, go to step 6.

**Removing the display board**

- 6 The display board is located at the left center of the telephone. Disconnect the display ribbon cable from the display board. Remove the small mounting screw from the board. Grasp the board firmly on each end and pull upward to remove it. To replace it, go to step 9.

**Removing the display**

- 7 The power supply board is located on the left side of the telephone. Remove the two small screws from the power supply board (near the top) and set them aside. Grasp the board firmly on each side. Carefully work the board loose until released.
- 8 Remove the two or three screws from the display Module. Remove the display from the telephone. To install the display, go to step 11.

### Installing the display board

- 9      Place the J1 connector of the display board over the P2 pins of the telephone (see Figure 57). Press down slowly until J1 slides onto the P2 pins and is firmly seated.

**Note:** If the center screw is included, do not perform step 10.

- 10     Insert the self-tapping Phillips-head screw supplied with the display into the mounting hole (near the top). Tighten firmly with a #1 Phillips screwdriver.

### Installing the display

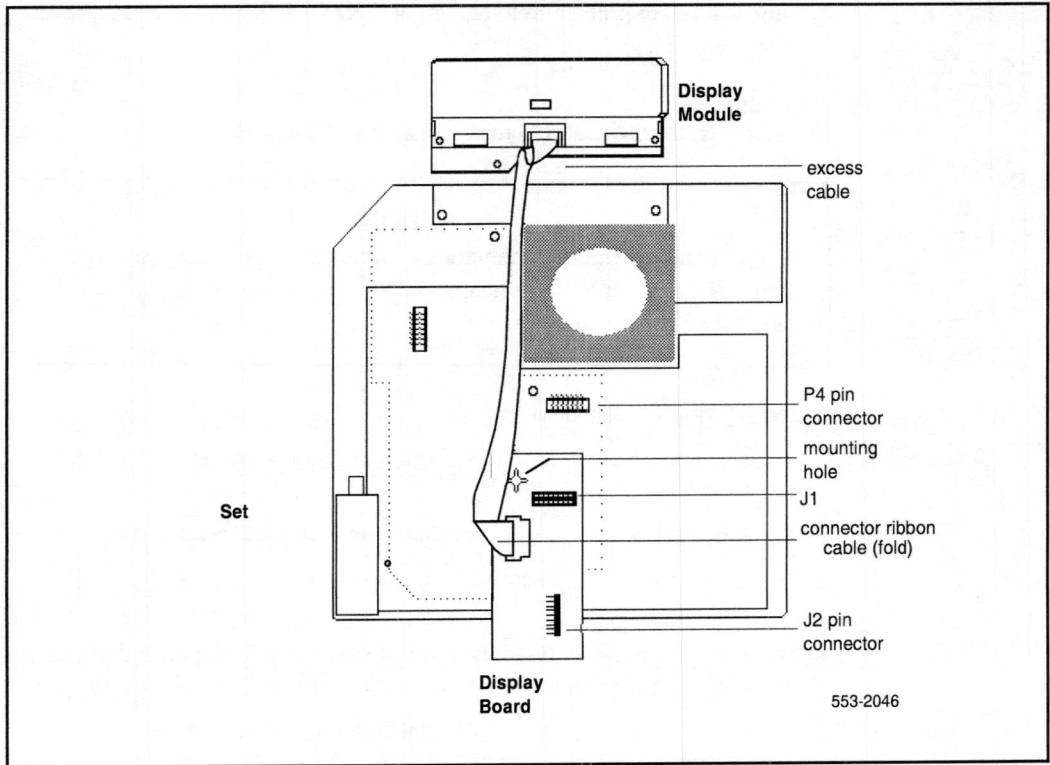
- 11     Place the display face-down near the top of the telephone and align the two mounting holes of the display with the mounting holes in the telephone.
- 12     Insert two self-tapping Phillips-head screws from the faceplate into the mounting holes; tighten them firmly with a #1 Phillips screwdriver.
- 13     Install the power supply board (see Procedure 80). This step is not necessary on M2616 unless you have other hardware options.
- 14     Fold the ribbon cable near the connector to align it with the J2 pins on the display board, ensuring that the notch on the ribbon cable is facing toward the display board. Carefully work the ribbon cable connector onto the J2 pins until firmly seated. Route the cable flat beside the power supply board, gathering excess cable under the display. Be careful not to press the cable beneath the alignment posts or studs of the base. See Figure 57.

**Note:** Do not allow R5 on the power supply board to become bent during this procedure.

- 15     Replace the base. If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack and replace the footstand (ensuring that the MPDA or MCA cable does not get pinched between the base and the footstand). Make sure the footstand is firmly seated in the base.

**Note:** Place the label supplied with the display on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.

**Figure 57**  
**Display cable routing**



- 16** Tighten all screws, reconnect all cords, and place the telephone in the normal operating position.
- 17** Perform the self-test (see Procedure 16) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400).

## **Installing NT2K28AA displays on NTZK or NT2K sets**

Use the following procedure to add an NT2K28AA display to M2008 and M2616 telephones.

### **Procedure 84**

#### **Installing NT2K28AA displays on NTZK or NT2K sets**

##### **CAUTION**

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

### **Opening the Telephone**

- 1      Disconnect and remove all cords (including the handset) from the telephone.
- 2      Place the telephone, upside-down, on a padded, level surface.
- 3      Using a #1 Phillips screwdriver, remove the two screws from the footstand.
- 4      Carefully remove the footstand from the base. Press inward at the back of the footstand where it meets the base and pull upward.
- 5      If the telephone has a Meridian Communications Adapter, unplug its cable from the base telephone jack.
- 6      Loosen all screws on the base of the telephone.
- 7      Remove the base from the telephone.

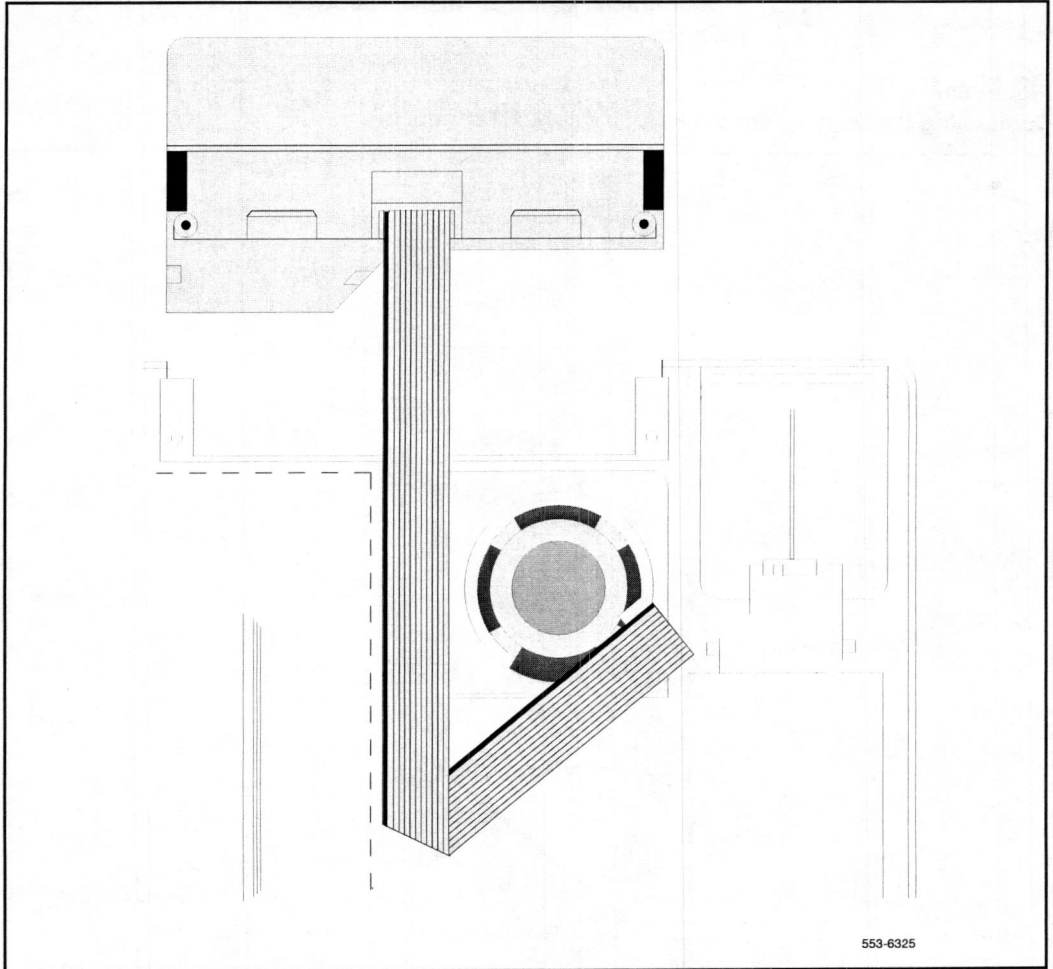
### **Removing the Fillerplate**

- 8      Loosen the screws that hold the fillerplate.
- 9      Remove the fillerplate, being careful not to touch the foam in the speaker housing.

### **Attaching the Display Module**

- 10     Position the Display Module as shown in Figure 58.
- 11     Lower the Display Module into place.
- 12     Insert the fillerplate screws in the Display Module screw holes

**Figure 58**  
**Positioning the display module**



- 13** Tighten the fillerplate screws.

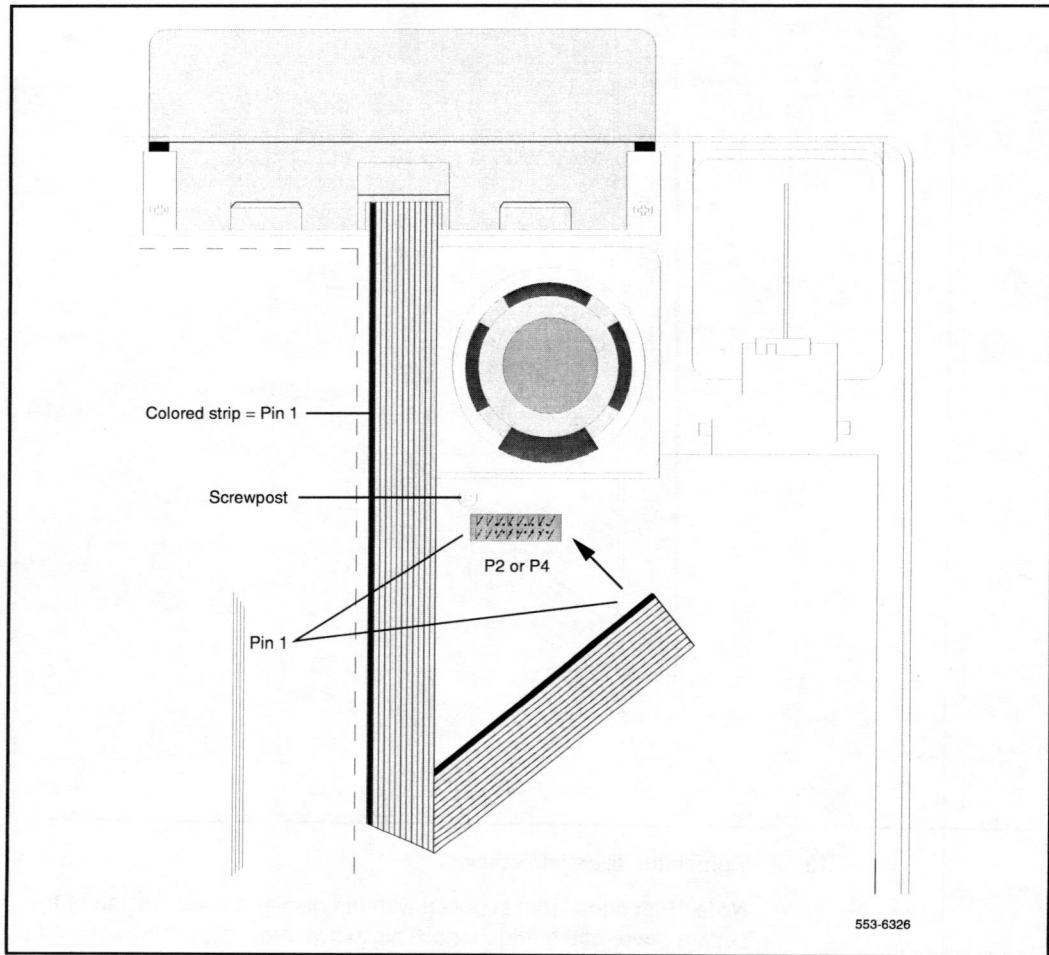
**Note:** Place the label supplied with the display on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.



### Connecting the Display Module Ribbon Cable

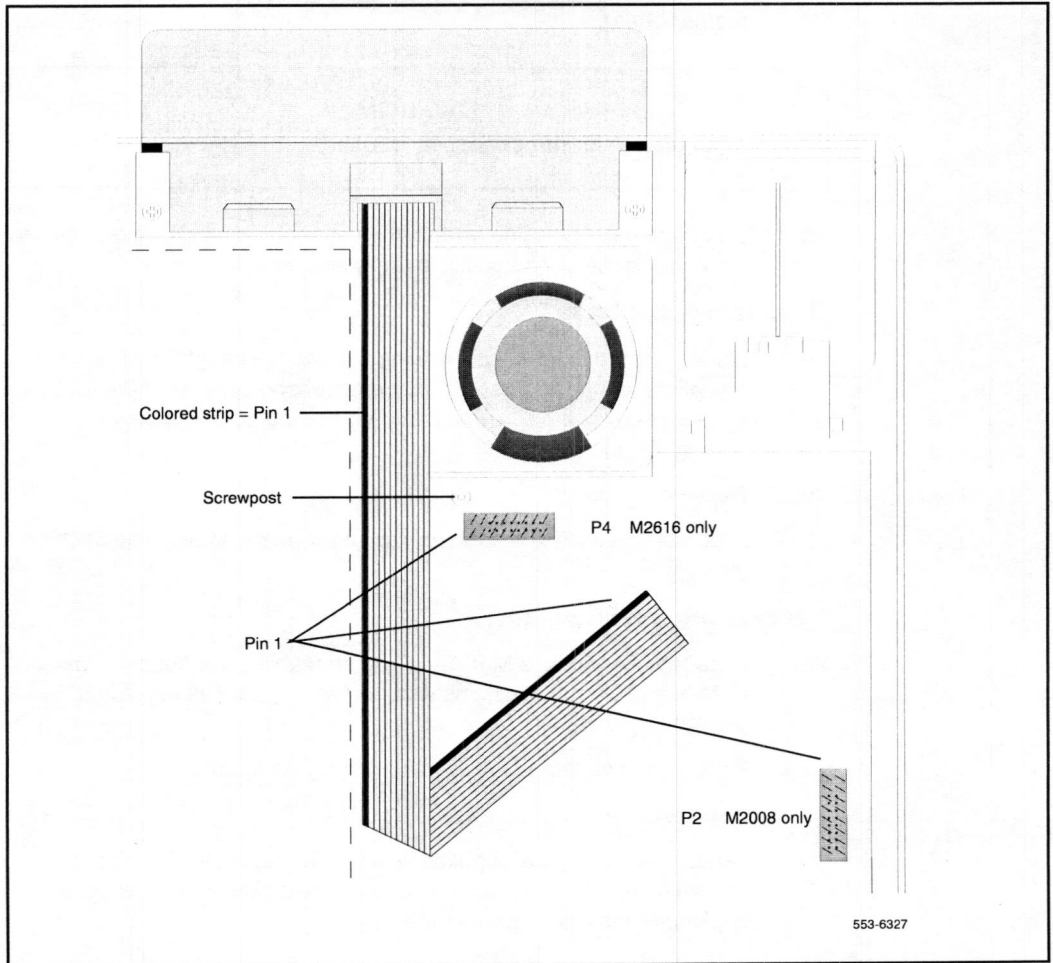
- 14 **NTZK models:** Make sure that the ribbon cable is folded as shown in Figure 59.

**Figure 59**  
**Connecting the Display Module Ribbon Cable, NTZK model**



- 15 **NT2K models:** Make sure that the ribbon cable is folded as shown in Figure 60.

**Figure 60**  
**Connecting the Display Module Ribbon Cable, NT2K model**



- 16** Make sure the red line on the ribbon cable lines up with the white dot beside the connector pins (P2 on an NT2K M2008, J3 on an NT2K M2008, and P4 on an M2616) on the mother board.

- 17    Slide the ribbon cable connector onto the connector pins (P2 on an NTZK M2008, J3 on an NT2K M2008, and P4 on an M2616) on the mother board.

**CAUTION**

This is a polarity-sensitive connection.

- 18    Ensure that the pins line up with the connector correctly and carefully work the connector on until it is firmly seated.

**Reattaching the Base**

- 19    Make sure the ribbon cable is lying flat and not caught over or under any alignment posts or studs on the telephone base. (For the M2616, allow it to cover the screwpost and do not replace the screw on re-assembly.)
- 20    Replace the base.
- 21    Insert all screws (except the center screw on the M2616) and tighten them.

**Reattaching the Footstand**

- 22    If the telephone has a Meridian Programmable Data Adapter (MPDA) or Meridian Communications Adapter (MCA), plug its cable into the jack on the telephone base.
- 23    Replace the footstand, positioning it firmly on the base.
- 24    Insert and tighten all screws.

**Note:** Place the label supplied with the display on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.

**Reconnecting the Telephone**

- 25    Reconnect all cords.
- 26    Turn the telephone right-side-up and place it in a normal operating position.
- 27    Reconnect the handset.

## Installing NT2K24WA or NT2K25YL displays on NT2K sets

Use Procedure 85 to install the display on the M2008 set. Use Procedure 86 on page 200 to install the display on the M2616 set.

### **Procedure 85**

#### **Installing and removing the M2008 Display on NT2K sets**

##### **CAUTION**

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1** Remove the handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2** Disconnect all cords from the telephone.
- 3** Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 4** If the telephone is equipped with an MPDA or MCA, unplug the data cable from the base telephone jack. Remove the four screws securing the base to the telephone. Remove the base and set it aside.
- 5** The power supply board (if equipped) is located on the left side of the telephone. Remove the two small screws from the power supply board (near the top) and set aside. Grasp the board firmly on each side. Carefully work the board loose until it is released.
- 6** If the telephone is not equipped with a display, go to step 9. If the telephone is equipped with a display, go to step 7.

#### **Removing the display board**

- 7** The display board is located at the left center of the telephone. Disconnect the display ribbon cable from the display board. Remove the small screw from the board. Disconnect the P0738600 cable from connector J3 on the M2008. Remove the board and cable from the set. To replace, go to step 9.

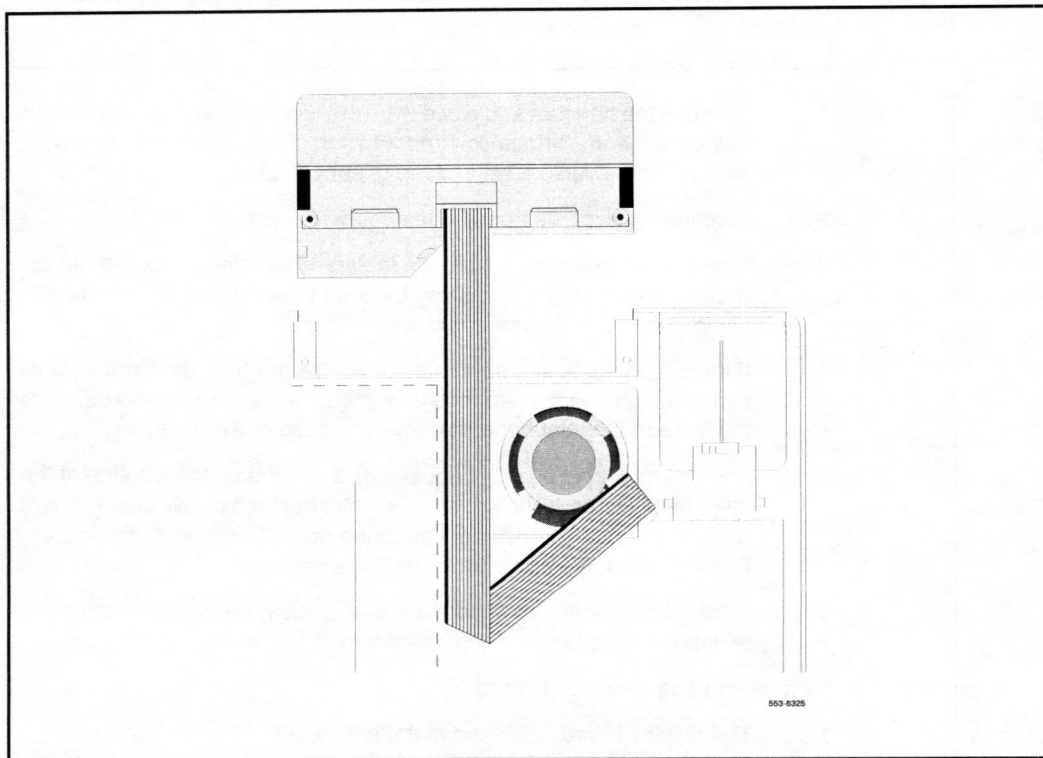
### Removing the display

- 8 Remove the two or three screws from the display module. Remove the display from the telephone. To install the display option, go to step 11.

### Installing the display board

- 9 Connect the P0738600 cable to the J1 connector of the display board. Place the board on the mounting post (see Figure 61).

**Figure 61**  
**Connecting the cable to the display board**



- 10 Insert the self-tapping Phillips-head screw supplied with the display into the mounting hole (near the top). Tighten it firmly with a #1 Phillips screwdriver.

- 11 Connect the loose end of the P0738600 cable to the J3 pins of the telephone. Press down until the connector slides onto the J3 pins and is firmly seated.

### **Installing the display**

- 12 Place the display facedown near the top of telephone and align the two mounting holes of the display with the two mounting holes of the telephone.

- 13 Insert two self-tapping Phillips-head screws from the faceplate into the mounting holes; tighten them firmly with a #1 Phillips screwdriver.

**Note:** Do not allow R5 on the power supply board to become bent during this procedure.

- 14 If the MPDA or MCA option is installed, install the power supply board (see Procedure 81).

- 15 Fold the ribbon cable near the connector to align with the J2 pins on the display board, ensuring that the notch on the ribbon cable is facing toward the display board. Carefully work the ribbon cable connector onto the J2 pins until it is firmly seated. Route the cable flat beside the power supply board, gathering excess cable under the display. Be careful not to press the cable beneath the alignment posts or studs of the base. See Figure 61.

- 16 Replace the base. If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack and replace the footstand (ensuring that the MPDA or MCA cable does not get pinched between the base and footstand). Make sure the footstand is firmly seated to the base.

**Note:** Place the label supplied with the display on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.

- 17 Tighten all the screws, reconnect all cords, and place the telephone in the normal operating position.

- 18 Perform the self-test (Procedure 16) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400).

## **Procedure 86**

### **Installing and removing the M2616 Display on NT2K sets**

#### **CAUTION**

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1** Remove the handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2** Disconnect all cords from the telephone.
- 3** Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 4** If the telephone is equipped with an MPDA or MCA, unplug the data cable from the base telephone jack. Remove the five screws securing the base to the telephone. Remove the base and set it aside.
- 5** If the telephone is not equipped with a display, go to step 9. If the telephone is equipped with a display, go to step 6.

#### **Removing the display board**

- 6** The display board is located at the left center of the telephone. Disconnect the display ribbon cable from the display board. Remove the small mounting screw from the board. Grasp the board firmly on each end and pull upward to remove it. To replace it, go to step 9.

#### **Removing the display**

- 7** The power supply board is located on the left side of the telephone. Remove the two small screws from the power supply board (near the top) and set them aside. Grasp the board firmly on each side. Carefully work the board loose until released.
- 8** Remove the two or three screws from the display Module. Remove the display from the telephone. To install the display, go to step 11.



**Installing the display board**

- 9 Place the J1 connector of the display board over the P4 pins of the telephone (see Figure 61). Press down slowly until J1 slides onto the P4 pins and is firmly seated.
- 10 Insert the self-tapping Phillips-head screw supplied with the display into the mounting hole (near the top). Tighten firmly with a #1 Phillips screwdriver.

**Installing the display**

- 11 Place the display face-down near the top of the telephone and align the two mounting holes of the display with the mounting holes in the telephone.
- 12 Insert two self-tapping Phillips-head screws from the faceplate into the mounting holes; tighten them firmly with a #1 Phillips screwdriver.
- 13 Install the power supply board (see Procedure 80). This step is not necessary on M2616 unless you have other hardware options.
- 14 Fold the ribbon cable near the connector to align it with the J2 pins on the display board, ensuring that the notch on the ribbon cable is facing toward the display board. Carefully work the ribbon cable connector onto the J2 pins until firmly seated. Route the cable flat beside the power supply board, gathering excess cable under the display. Be careful not to press the cable beneath the alignment posts or studs of the base. See Figure 61.

**Note:** Do not allow R5 on the power supply board to become bent during this procedure.

- 15 Replace the base. If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack and replace the footstand (ensuring that the MPDA or MCA cable does not get pinched between the base and the footstand). Make sure the footstand is firmly seated in the base.

**Note:** Place the label supplied with the display on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.

- 16 Tighten all screws, reconnect all cords, and place the telephone in the normal operating position.
- 17 Perform the self-test (see) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400)

## External Alerter Board

Use this procedure to add an External Alerter Board to the M2006, M2008, M2216ACD, or M2616 telephone. See Figure 62 for information on hooking up the third-party External Alerter device.

### Procedure 87

#### Installing and removing the External Alerter Board

##### CAUTION

Before handling internal telephone components, you must discharge static electricity from your hands and tools by touching any grounded metal surface or conductor.

- 1 Remove the handset and place the telephone upside down on a level, solid work surface covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2 Disconnect all cords from the telephone.
- 3 Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 4 If the telephone is equipped with an MPDA or MCA, unplug the data cable from the base telephone jack.
- 5 Remove the four screws securing the base of the telephone to the top cover. Remove the base and set aside.
- 6 If the telephone is not equipped with an External Alerter Board, go to step 8. If you wish to replace an existing External Alerter Board, go to step 7.

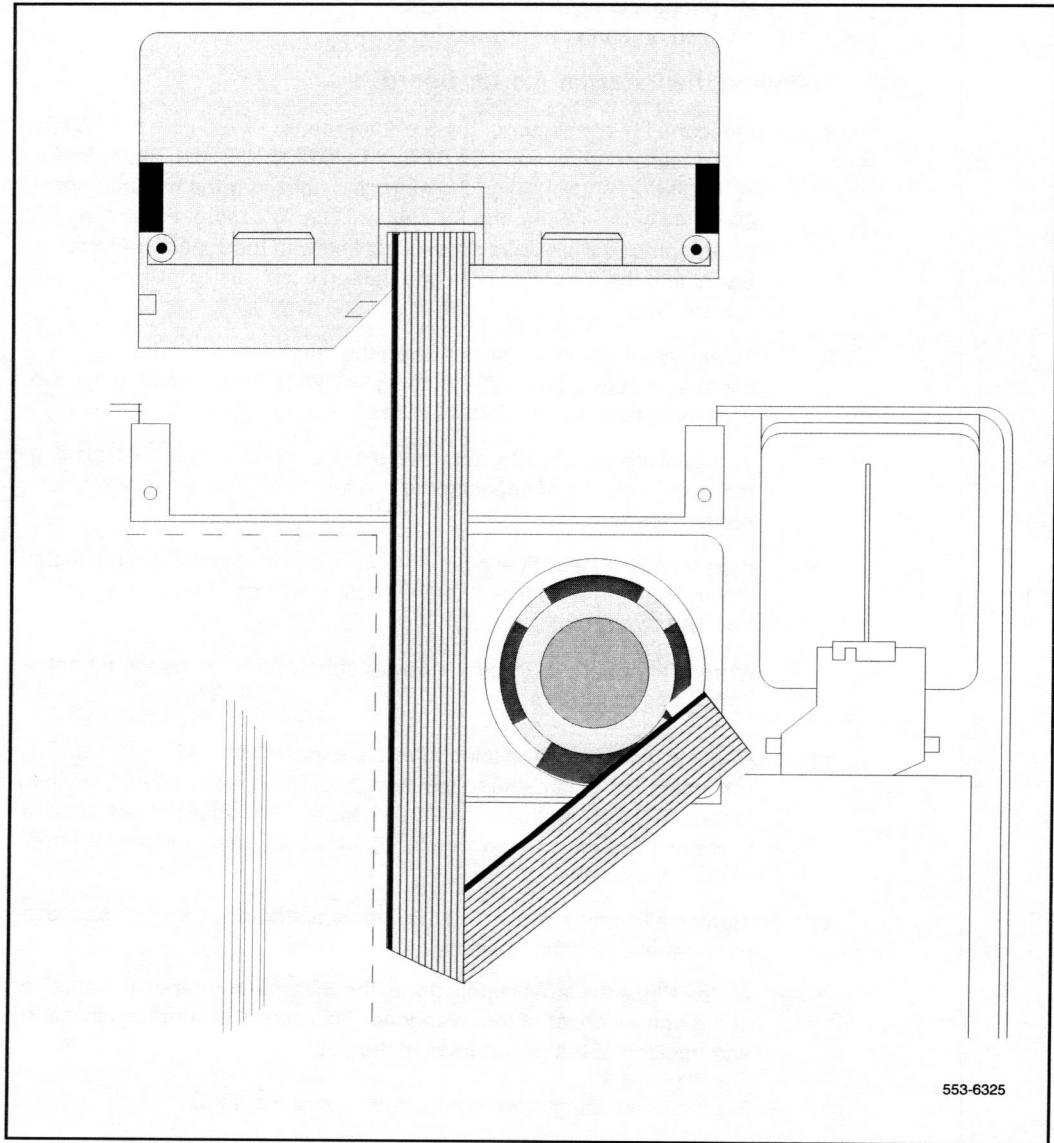
## Removing the External Alerter Board

- 7 The External Alerter Board is located at the right center of the telephone. Remove the screws from the board. Grasp the board firmly on each end and pull upward to remove.

## Installing the External Alerter Board

- 8 Place the H1 connector of the External Alerter Board over the P3 pins of the telephone (see Figure 51 for M2006/M2008; see Figure 52 for M2616/M2216ACD). Align the mounting hole over the mounting post. Carefully work H1 onto the P3 pins until firmly seated. Place the self-tapping Phillips-head screw supplied with the External Alerter Board into the mounting hole and tighten it with a #1 Phillips screwdriver.
- 9 To signal the External Alerter when the telephone's handset or speaker is active, place the jumpers (AO288529) connecting the two right-most pins on the alerter board.  
  
To signal the External Alerter when the telephone is ringing or buzzing, place the jumpers connecting the two left-most pins on the External Alerter Board.
- 10 If the telephone is not yet equipped with the power supply board, install it (see Procedure 80 for M2006/M2008; see Procedure 81 for M2616/M2016S/M2216ACD).  
  
**Note:** Do not allow R5 on the power supply board to become bent during this procedure.
- 11 Replace the base. If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack and replace the footstand (ensuring that the MPDA or MCA cable does not get pinched between the base and the footstand). Make sure the footstand is firmly seated in the base.
- 12 Tighten all screws, reconnect the line cord, and place the telephone in the normal operating position.  
  
**Note:** Place the label supplied with the External Alerter on the outside of the bottom cover of the telephone. This allows proper identification and tracking of the option level of the set.
- 13 For the connecting block configuration, see Figure 62.
- 14 Perform the self-test (see Procedure 16) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400).

**Figure 62**  
**External Alerter connecting block configuration**



## Key Expansion Modules

Use this procedure to add one (single) or two (double) Key Expansion Modules to the M2616 or M2216ACD telephones.

**Note 1:** Before installing the Key Expansion Module(s), you must have the associated footstand.

**Note 2:** Adding a Key Expansion Module to a telephone requires a power supply board along with an additional power source (see Procedure 70 for M2006/M2008; see Procedure 80 for M2616/M2216ACD).

### Procedure 88

#### Installing and removing Key Expansion Module(s) on the M2616 and M2216ACD telephones

- 1 Remove the handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2 Disconnect all cords from the telephone.
- 3 Remove the two screws from the footstand assembly and unsnap the footstand assembly from the telephone by pressing inward at the back of the footstand where it meets the base and pulling upward.

**Note:** If the M2616/M2216ACD is equipped with a Meridian Programmable Data Adapter (MPDA) or Meridian Communications Adapter (MCA), it must be removed and installed into the Key Expansion Module footstand. Use Procedure 77.

- 4 If the telephone is not equipped with a Key Expansion Module(s), go to step 7. If you are replacing the Key Expansion Module(s), go to step 5.

#### Removing the Key Expansion Module(s)

- 5 Remove the screws from the footstand assembly (where it meets the Key Expansion Module), and unsnap the footstand assembly from the Key Expansion Module and telephone by pressing inward at the back of the footstand where it meets the base and pulling upward.
- 6 Remove the interface cable from the telephone by pressing down on the locking tab. If equipped, remove the interface cable from the first Key Expansion Module (closest to the telephone).

### Installing the Key Expansion Module(s)

- 7 If the telephone is not yet equipped with the power supply board, install the Power Board (see Procedure 80).
- 8 Align the bottom of the Key Expansion Module(s) to the bottom of the telephone (see Figure 63).
- 9 Snap the ribbon cable connector into the bottom interface jack on the Key Expansion Module.

**Note:** Use the cable supplied with the module. This is a special cable required for EMI compliance.

Snap the other end of the ribbon cable into the interface jack in the telephone (left side). Gather the excess cable in the base of the Key Expansion Module.

- 10 To add a second Key Expansion Module, snap a second ribbon cable connector into the bottom interface jack on the second Key Expansion Module. Snap the other end of the ribbon cable into the top interface jack on the first Key Expansion Module (see Figure 63). Gather the excess cable in the base of the second Key Expansion Module.
- 11 If the telephone is equipped with an MPDA or MCA, reconnect the data cable to the base telephone jack. Make sure the MPDA or MCA cable (and interface cable) do not get pinched between the base and footstand.
- 12 Secure the footstand to the Key Expansion Module(s) and telephone by placing the tabs of the footstand into the slots provided on the base of the Key Expansion Module and telephone and pressing down. Make sure the footstand is firmly seated on the base.

**Note:** Use the cable supplied with the module. This is a special cable required for EMI compliance. Newer versions of the Key Expansion Module use a longer modified cable than was used on earlier versions.

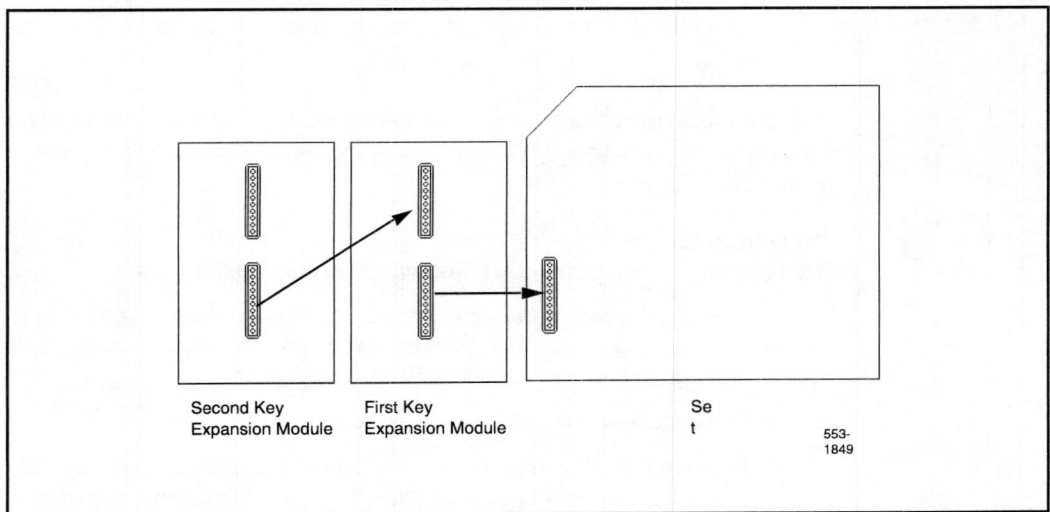
Ensure that the ribbon cable(s) are not pinched between the footstand and mounting posts.

- 13 Insert the three (four if you have two modules) self-tapping, Phillips-head screws supplied with the Key Expansion Module into the mounting holes in the bottom of the footstand. Tighten firmly with a #1 Phillips screwdriver.

**Note:** Place the label supplied with the Key Expansion Module(s) on the outside of the bottom cover or footstand of the telephone. This allows proper identification and tracking of the option level of the set.

- 14 Perform the self-test (see Procedure 16) and acceptance test procedures. See LD 31 in the *X11 input/output guide* (553-3001-400).

**Figure 63**  
**Key Expansion Module connections (bottom view)**





## Wall mounting

The M2006, M2008, M2616, and M2016S telephones are equipped with a reversible footstand that allows for wall mounting. The wall mount clip should be purchased and inserted in the handset well to hold the handset securely in place on wall-mounted telephones. You can hang Meridian Modular Telephones on the wall with an installed display or Key Expansion Module.

**Note:** The footstand cannot be reversed when the Meridian Programmable Data Adapter or Meridian Communications Adapter is equipped, so telephones with data cannot be wall-mounted. Additionally, some wall plates are too deep to allow for wall mounting on top of the plate. In these cases you should mount the telephone on the wall next to the plate.

An additional clip is provided for wall mounting the telephone. This clip is attached to the switchhook rest to prevent the handset from slipping when mounted on the wall.

### Procedure 89

#### Wall mounting instructions for Meridian Modular Telephones

- 1 Remove the handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to prevent damage to movable keys and the telephone face.
- 2 Disconnect all cords from the telephone.
- 3 Remove the two screws from the footstand assembly and unsnap the footstand assembly by pressing inward at the back of footstand where it meets the base, and pulling upward.
- 4 Rotate the footstand 180° and snap the footstand back into place on the telephone bottom cover. Make sure the footstand is firmly seated on the base of the telephone.
- 5 Tighten all screws and replace all cords.
- 6 Insert the wall mounting clip in the switchhook rest.
- 7 Mount the telephone on the wall using the wall mount holes provided on the bottom of the footstand.

## Troubleshooting

Use Table 41 to check problems encountered when installing Meridian Modular Telephones and their options.

**Table 41**  
**Troubleshooting Meridian Modular Telephones (Part 1 of 4)**

Symptom	Solution
Telephone does not work.	<ol style="list-style-type: none"> <li>1 Unplug the line cord from the telephone and plug it back in.</li> <li>2 If the telephone uses external power, make sure the transformer or closet power supply is properly connected and that the power supply board is properly installed.  If the telephone does not use external power, make sure that jumpers are placed connecting the bottom two sets of pins on the P1 connector on the main circuit board.</li> </ol>
All LCDs flash and telephone does not function.	<ol style="list-style-type: none"> <li>1 Press the Release (Rls) key.</li> <li>2 Unplug the line cord from the telephone and plug it back in.</li> </ol>
Telephone wobbles.	<ol style="list-style-type: none"> <li>1 Ensure that all cords are properly routed through channels in the footstand.</li> <li>2 Check that the footstand is firmly seated on the telephone.</li> <li>3 Ensure that all feet are firmly seated in the footstand.</li> </ol>
Display does not work.	<ol style="list-style-type: none"> <li>1 Unplug the line cord from the telephone and plug it in again.</li> <li>2 Ensure that the transformer is plugged in or the closet power is connected (M2008 only).</li> <li>3 Ensure that the power supply board is installed properly (M2008 only).</li> </ol>

**Table 41**  
**Troubleshooting Meridian Modular Telephones (Part 2 of 4)**

Symptom	Solution	
Display does not work. (cont.)	4	Check that the display ribbon cable is properly connected to the display board and has not been pinched.
	5	Ensure that the display board is installed correctly and held securely with a mounting screw.
	6	M2006, M2008, M2616—ensure that ADD class of service is configured in LD 11. See the <i>X11 input/output guide</i> (553-3001-400).
There is no response when you type <CR> or AT at the terminal.	1	Press the P key and dial 28 to make sure you are in terminal mode.
	2	Make sure your PC or terminal's power is on and you are online.
	3	If the equipment connected to your MCA is not configured as Data Terminal Equipment, you will need to connect using a null modem cable.
	4	Make sure the MCA is receiving external power. Check to see that the power cables are connected properly and the external power supply is running.
	5	If you have a display on your phone, press the P key and dial 63 to get into EIA Monitor mode. Be sure the MCA is receiving signals from your terminal by watching the display while entering carriage returns on the keyboard. If the indicator flashes, the connection is correct. If not, check the cable to make sure it is the standard RS-232 and is properly connected.
	6	Press the P key and dial 62 to ensure that the MCA is in the asynchronous mode. Press the P key and dial 20 to change to the asynchronous mode.
	7	Press the P key and dial * to ensure that the MCA is in the idle mode.

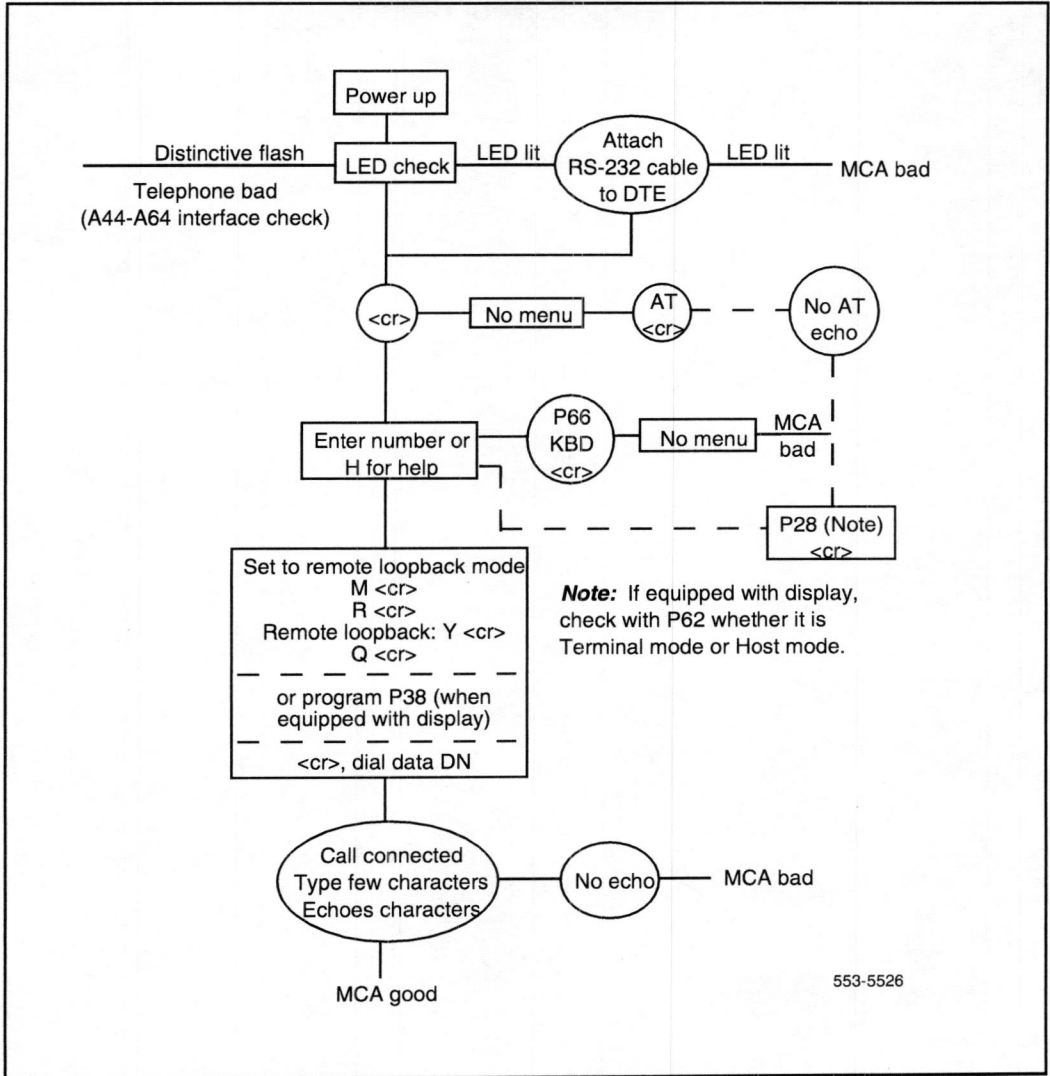
**Table 41**  
**Troubleshooting Meridian Modular Telephones (Part 3 of 4)**

Symptom	Solution
The prompt CALL CONNECTED. SESSION STARTS is followed by RELEASE.	Check the configuration parameters of the far end data device. If they do not match those of your MCA, the call will be dropped. You will have to change the parameters of your MCA to match.
Garbled prompts are sent to your terminal when you type <CR>.	Enter a period ( . ) followed by <CR> to perform an autoparity.
You are connected to a host computer, but get no response when you try to log on.	First, release the call. Turn on Remote Loopback and make the call again. Type some characters at your terminal. If they echo back and appear on your terminal, the problem is with the far end data device. If the characters do not appear on your terminal, the problem is with the MCA. Call your telephone system administrator.
You try to make a data call from the initial prompt (or Main menu) in keyboard dialing. You see the prompt CALLING.	First, hold down the break key(s) for two seconds, enter <CR>, and try again to make the data call. If the problem persists, your MCA is probably disabled. Call your telephone system administrator.
MCA does not operate at all.	<ol style="list-style-type: none"> <li>1 Check the LED in the back of the telephone to see if it is flashing. If the LED is steadily lit, the MCA needs to be configured in your system, or it may be bad. If the LED is not lit, the MCA requires external power.</li> <li>2 Make sure the cable from your terminal or PC is connected to the MCA.</li> <li>3 Check the data parameters for your display.</li> <li>4 Be sure the transformer is plugged in, or the closet power is connected.</li> <li>5 Be sure the cable between the MCA and your telephone is connected and has not been pinched.</li> <li>6 Be sure the power card is installed correctly. Verify that the jumper settings are correct for either RS-232 or V.35 (whichever you are using).</li> </ol>

**Table 41**  
**Troubleshooting Meridian Modular Telephones (Part 4 of 4)**

Symptom	Solution
Key Expansion Module does not work.	1 Unplug and plug in the line cord.
	2 Ensure that the transformer is plugged in or that the closet power supply is connected.
	3 Ensure that the power supply board is installed properly.
	4 Make sure that the ribbon cable connecting the telephone and the Key Expansion Module is routed properly and is not pinched.
External Alerter does not work.	1 Ensure that the External Alerter Board is installed properly.
	2 Check that connections between the alerting device and the telephone connecting block are correct.
	3 Make sure that the jumpers are placed on the pins on the External Alerter Board as described in Procedure 87 on page 202.
	4 Ensure that the transformer is plugged in or the closet power is connected.
	5 Ensure that the power supply board is installed properly.
<b>Note 1:</b> If the pseudorandom pattern 511 data is idle, the telephone keypad dialing is inoperative. Use the release key to clear this condition.	
<b>Note 2:</b> If you are using an RS-232 cable to connect the MCA to an ADM3/5 terminal, be sure pin 22 is disconnected.	
<b>Note 3:</b> Change the baud rate before you change the mode from synchronous to asynchronous.	
<b>Note 4:</b> Some terminals may drop DTR with the break. If this happens, RELEASE is not displayed.	

**Figure 64**  
**Flowchart for troubleshooting MCA**







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Meridian 1

## **Telephone and attendant console installation**

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**NETWORKS™**

M3900 SERIES  
INSTALLATION  
553-3001-216





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Meridian 1

# **M3900 Series Meridian Digital Telephones**

## **Description, Installation and Administration**

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M3900 Series Telephones Description, Installation and Administration



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## Revision history

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June 1999

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---

# Preface

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This guide provides feature, expansion module, and specification information for the M3900 Series Meridian Digital Telephones.

## Other documentation

For more information, refer to the following documentation:

- *Digital telephone line engineering* (553-2201-180)
- *Meridian Communications Unit and Meridian Communications Adapter description, installation, administration, operation* (553-2731-109)
- *Spares planning* (553-3001-153)
- *Meridian 1 equipment identification* (553-3001-154)
- *Meridian 1 line cards description* (553-3001-105)
- *X11 features and services, International* (553-3001-306)  
*X11 features and services, North American* (553-3001-305)
- *Software Input/Output Guide X11 Administration, International* (553-3001-311)  
*X11 input/output guide, North American* (553-3001-400)
- *Software Input/Output Guide X11 System Messages* (553-3001-411)
- *Asynchronous Data user guide* (P0661883)



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## Functional description

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This document introduces the M3900 Series Meridian Digital Telephones. It provides you with a description, installation and administration of the M3900 Series Telephone. Features for the five models are found on the following pages.

- Functional description of each telephone:
  - “M3901 Entry Telephone” on page 8
  - “M3902 Basic Telephone” on page 9
  - “M3903 Enhanced Telephone” on page 10
  - “M3904 Professional Telephone” on page 11
  - “M3905 Call Center Telephone” on page 13
- “General features” on page 4
- “Hardware options” on page 25
- “Configure the M3900 Series Meridian Digital Telephone” on page 15
- “Installation” on page 29
- “Environmental and safety considerations” on page 33

M3900 Series Meridian Digital Telephones provide integrated voice and data communication. The M3900 Series Telephones communicate with the Meridian 1 through digital transmission over standard twisted-pair wiring.

The M3900 Meridian Digital Telephone interfaces with the Digital Line Card (DLC) in the Intelligent Peripheral Equipment (IPE) shelf of the system. The DLC supports 16 voice and 16 data ports. The system software assigns a Terminal Number (TN) to each port in the system.

## General features

The five models of the M3900 series telephones have specific characteristics. Refer to:

- “M3901 Entry Telephone” on page 8
- “M3902 Basic Telephone” on page 9
- “M3903 Enhanced Telephone” on page 10
- “M3904 Professional Telephone” on page 11,
- “M3905 Call Center Telephone” on page 13.

The M3900 Series Meridian Digital Telephones support features through:










- Fixed Feature Keys
- Programmable Line/Feature Keys (Self-labeled)
- Programmable Feature Keys (Self-labeled)

## Feature keys

### Fixed Feature Keys

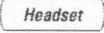

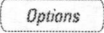
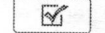
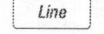


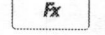
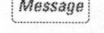

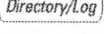
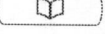
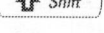

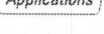



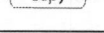
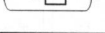

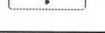

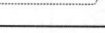
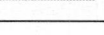
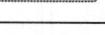


The Fixed Feature Keys are the feature keys on your M3900 Series Meridian Digital Telephone that are pre-labeled with the assigned feature. The Fixed Feature Keys appear on the telephone with text or icon labels. Telephones with icon labels are only available in specific market areas. Refer to Table 1.

**Table 1**  
**Feature Key text and icon labels (Part 1 of 3)**

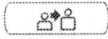

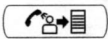
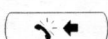

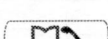
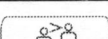
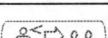
Feature Key	Text label	Icon label
Goodbye		
Hold		
Mute		
Handsfree		
Volume	NA	



**Table 1**  
**Feature Key text and icon labels (Part 2 of 3)**

Feature Key	Text label	Icon label
Headset		
Options		
DN line		
Feature Key (M3901 only)		
Message		
Directory/Log		
Shift		
Application		
Navigation		
Copy		
Transfer		
InCalls		
Not Ready		
Make Busy		

**Table 1**  
**Feature Key text and icon labels (Part 3 of 3)**

Feature Key	Text label	Icon label
Call Supervisor	<i>Supervisor</i>	
Answer Agent	<i>Ans Agent</i>	
Activity Key	<i>Activity</i>	
Answer Emergency	<i>Ans Emerg</i>	
Emergency	<i>Emergency</i>	
Call Log	<i>Call Log</i>	
Observe Agent	<i>Obv Agent</i>	
Display Calls Waiting	<i>Dsply Queue</i>	
Quit	<i>Quit</i>	NA

**Note:** Icon key labels are available in specific markets areas.

### Programmable Line/Feature Keys (Self-labeled)

The Programmable Line/Feature Keys (Self-labeled) are the keys located at the left and right sides of the upper section of the display area. The user can change the LCD label of these keys (with the exception of the primary Directory Number Key) to meet their needs. The Programmable Keys (Self-labeled) are the keys located on both sides of the upper section of the display area of the M3903, M3904, and the M3905 model.

The Programmable Line/Feature Key (Self-labeled) provides two layers of functionality on the M3903, M3904. The two layer keys on the M3903 and M3904 provides the user access to two Lines/Features per key. For example the M3904 has six Programmable Line/Feature Keys (Self-labeled), which provide the user with 12 line/feature keys accessible on the six keys.

**Programmable Feature Keys (Self-labeled)**

The Programmable Feature Keys (Self-labeled) are the three to four keys located below the lower portion of the display area on your M3903, M3904, and M3905 Meridian Digital Telephone. The Programmable Feature Keys (Self-labeled) provide three layers of features to each feature key on the M3903, M3904, and M3905. The features assigned to these keys are shown in:

- Table 4, "M3902 key configuration," on page 19
- Table 5, "M3903 key configuration," on page 20
- Table 6 "M3904 key configuration" on page 21
- Table 7, "M3905 key configuration," on page 22

**Programmable Features**

The M3901 can have five programmable features assigned. The user activates the features by pressing the Feature Key and assigned key pad keys as indicated by the Feature Card. The system administrator programs selected features for the M3901 telephone. For feature assignment information see Table 3, "M3901 key configuration," on page 18.

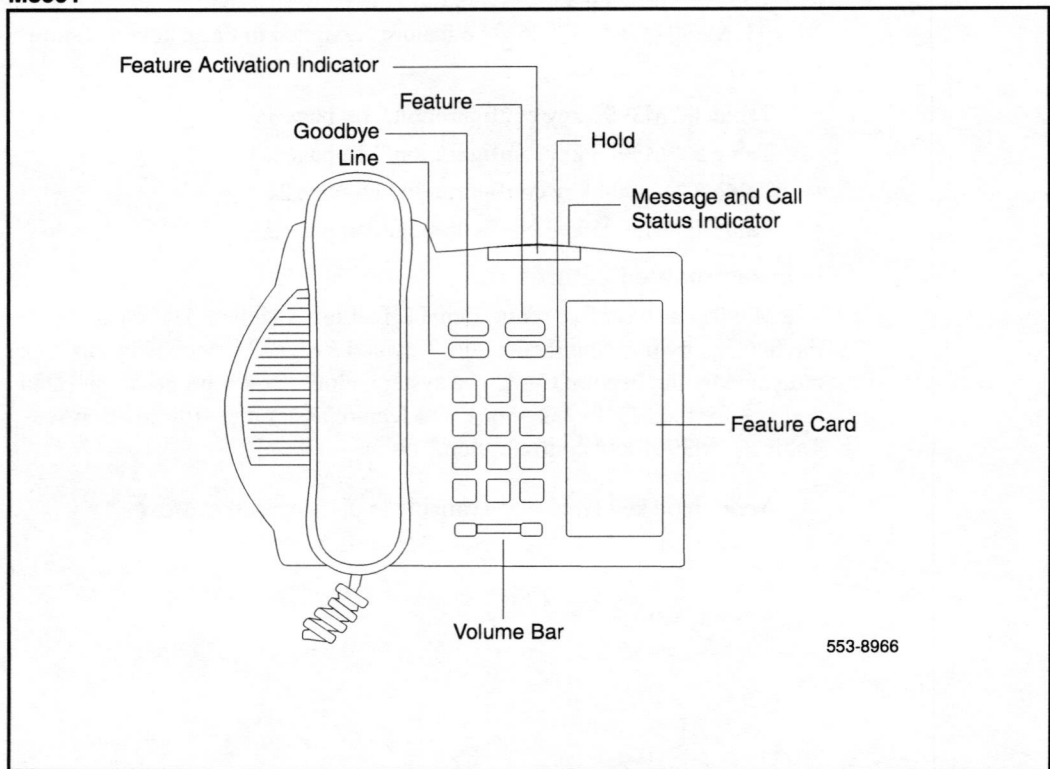
**Note:** Icon key labels are available in distinct market areas

## M3901 Entry Telephone

The features of the M3901 are:

- one line (Directory Number (DN)) capability
- five programmable features
- Feature Activation and Message Waiting and Incoming Call Status Indicator LED
- supports an amplified headset through the handset jack

**Figure 1**  
**M3901**

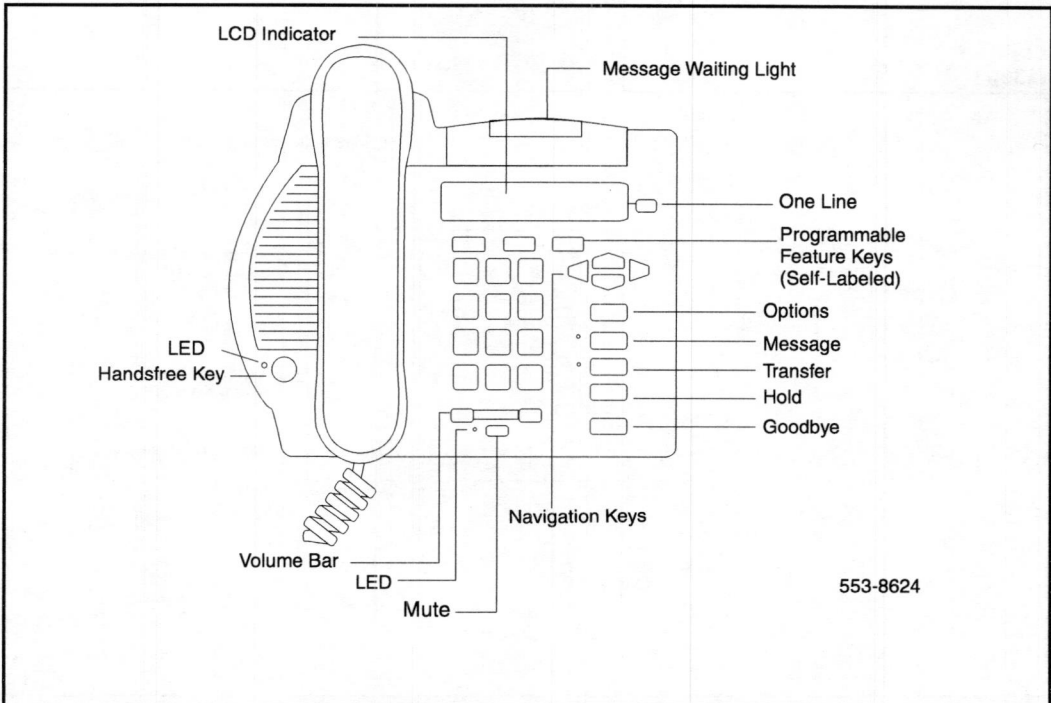


## M3902 Basic Telephone

The features of the M3902 are:

- one line (Directory Number (DN) capability
- three Programmable Feature Keys (Self-labeled)
- Fixed Feature Keys:
- two lines by 24 character display area
- handsfree calling option
- Group Listening
- on-hook dialing
- supports an amplified headset through handset jack
- one accessory port

**Figure 2**  
**M3902**

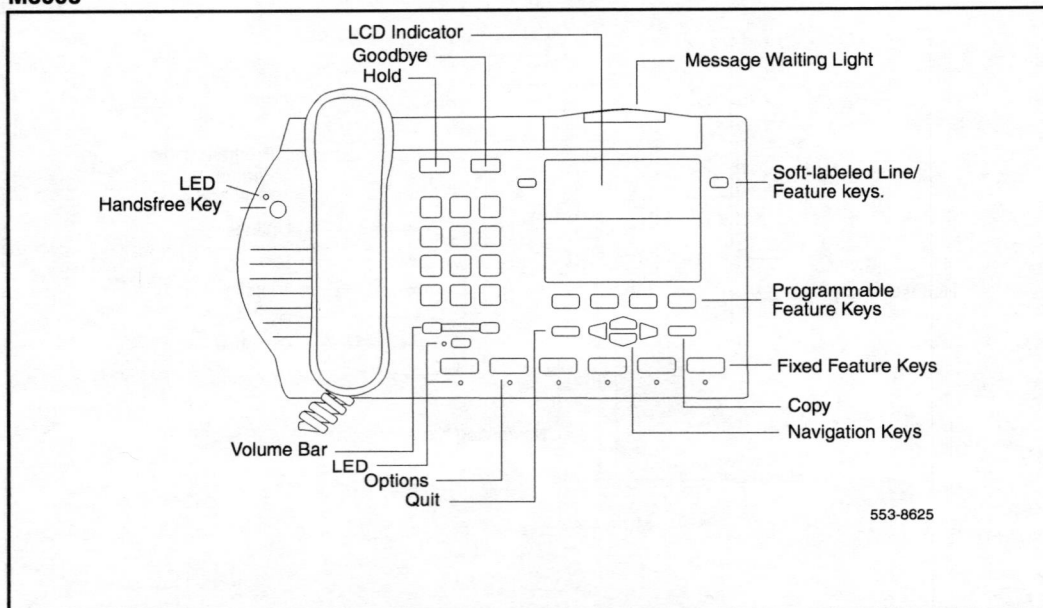


## M3903 Enhanced Telephone

The features of the M3903 are:

- two Programmable Line/Feature Keys (Self-labeled) which provide two layers each, giving the user access to four line/feature keys
- four Programmable Feature Keys (Self-labeled) which have three layers each, giving the user access to 12 feature keys
- Fixed Feature Keys
- three line by 24 character display area Call Log
- Group Listening
- on-hook dialing
- two accessory ports
- a headset port
- handsfree calling

**Figure 3**  
**M3903**



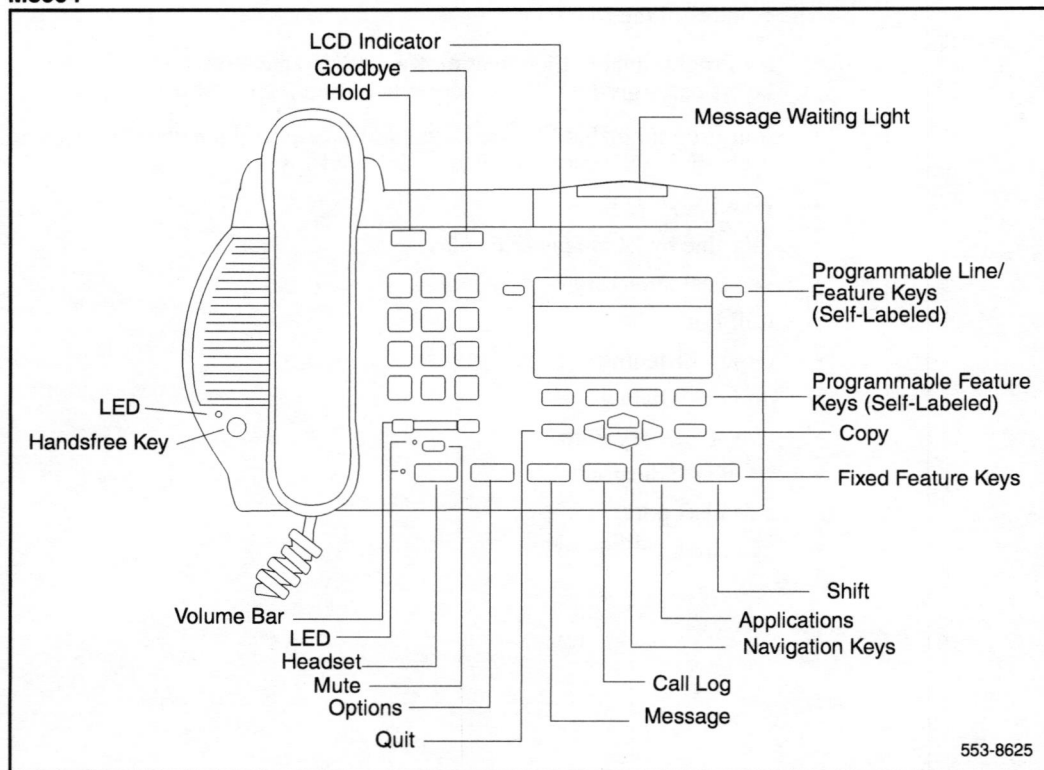
## **M3904 Professional Telephone**

The features of the M3904 are:

- six Programmable Line/Feature Keys (Self-labeled) which have two layers each, giving the user access to 12 line/feature keys
- four Programmable Feature Keys (Self-labeled) which have three layers each, giving the user access to 12 feature keys
- Fixed Feature Keys:
  - four line by 24 character display
  - Personal Directory
  - Call Log
  - Group Listening
  - on-hook Dialing
  - two Accessory Ports
  - speaker Indicator
  - a headset port
  - handsfree calling option



**Figure 4**  
**M3904**

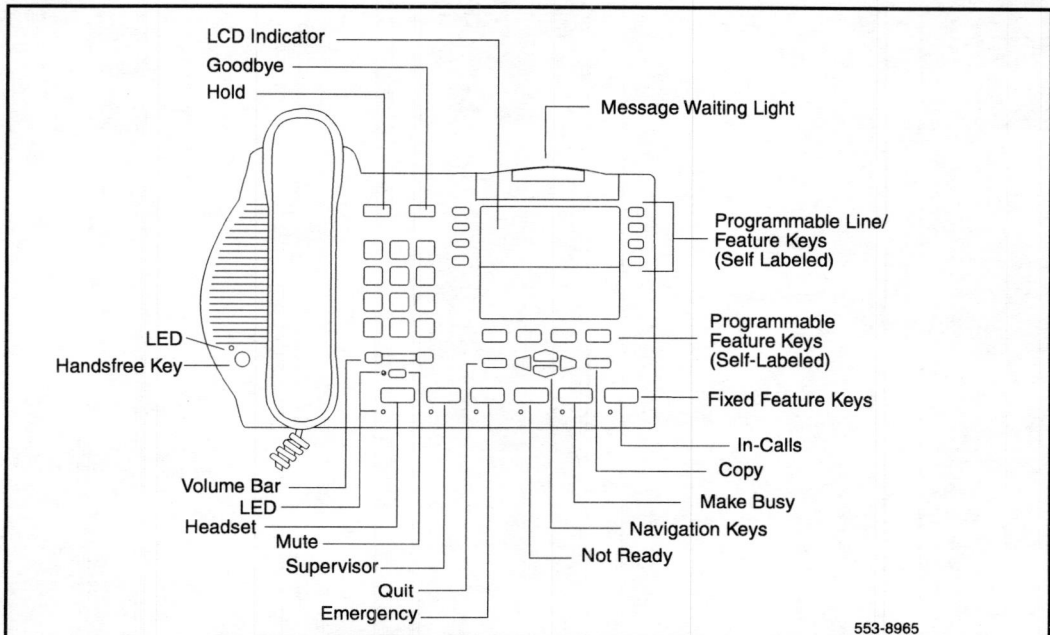


## M3905 Call Center Telephone

The features of the M3905 Call Center Telephone are:

- eight Programmable Line/Feature Keys (Self-labeled), giving the user access to eight line/feature keys
- four Programmable Feature Keys (Self-Labeled) which have three layers each, giving the user access to 12 feature keys
- six Fixed Feature Keys
- Personal Directory
- Call Log
- five line by 24 character display
- handset optional
- Supervisor Observe Key with LED
- Supervisor Headset Observe port

**Figure 5**  
**M3905**



**Note:** You can configure four of the bottom six Fixed Feature Keys to feature Keys that suit the business needs of the Call Center user.



## Configure the M3900 Series Meridian Digital Telephone

To configure the M3900 Series Meridian Digital Telephones follow these procedures:

- Configure the telephone type and class of service in LD 11.
- Configure the feature keys in LD 11
- Configure the Print request in LD 20

**Table 2**

**LD 11 - Configure the M3900 Series Digital Telephone (Part 1 of 3)**

Prompt	Response	Comments
REQ:	NEW CHG	Input new data. Change current data.
TYPE:	x..x	Type of telephone.  3901 = M3901. 3902 = M3902. 3903 = M3903. 3904 = M3904. 3905 = M3905.
TN	lscu  cu	Terminal number.  l = loop address. s = shelf address. c = card address. u = unit address.  For Option 11C input only the card and unit address. <b>Note 1:</b> If the telephone has an Analog Terminal Adapter (ATA), then you can use the voice Terminal Numbers can 16-31.

Table 2

## LD 11 - Configure the M3900 Series Digital Telephone (Part 2 of 3)

Prompt	Response	Comments
DES	d...d	Designator The response d...d represents an Office Data Administration System (ODAS) Station Designator of 1-6 alphanumeric characters.
CUST	xx	Customer number as defined in LD 15.
KBA	(0)-2	Key-based Expansion Module accessory prompt. This prompt appears when the set type is M3904 and M3905.
FDN	xxx...x	Flexible CFNA DN.
...	...	...
scpw	xxx...x	Station Control password.
...	...	...
CLS	aaaa	Class of Service options where: aaaa, = ADD-Automatic Digit Display, default M3902, M3903, M3904 & M3905. = (GRLD) Group Listening Denied, (M3902, M3903, M3904, M3905). = (GRLA) Group Listening Allowed, (M3902, M3903, M3904, M3905). = (HFD) Handsfree Denied, M3902, M3903 & M3904). = HFA Handsfree Allowed (M3902, M3903 & M3904). = (FLXD) FLXA, required if ATA equipped. = (VCE), DTA - voice, data terminal, required if ATA equipped. <b>Note 2: The Class of Service (CLS) must = fixa and vce if ATA equipped.</b>
DTAO	(mpda), mca	Data Option. MPDA = Meridian Data Adaptor. MCA = Meridian Communications Adaptor.

**Table 2****LD 11 - Configure the M3900 Series Digital Telephone (Part 3 of 3)**

Prompt	Response	Comments
- BAUD	(0)-(7)-10	Baud rate. Prompt appears if CLS = Data (DTA) and Open (OPE) = yes.  Enter data rate where: 9 = 28800 new baud rate for M3900 sets.
...	...	...
KEY	xx aaa yyy zzz	Telephone function key assignments where:  xx = key number. aaa = key name or function. yyy, zzz = additional information required.  <b>Note 3: Refer to the each telephone feature key tables which detail feature key defaults and assignments for:</b> <ul style="list-style-type: none"> <li>• "M3901 key configuration" on page 18.</li> <li>• "M3902 key configuration" on page 19.</li> <li>• "M3903 key configuration" on page 20.</li> <li>• "M3904 key configuration" on page 21.</li> <li>• "M3905 key configuration (Part 1 of 2)" on page 22.</li> </ul> <b>Note 4: MTAD (Meridian 1 Time and Date) -The system puts a block on the time and date key on all the M3900 Series Meridian Digital Telephones.</b>

**Table 3**  
**M3901 key configuration**

Key Number	Description
Key 0	Line (Directory Number). <b>Note 1: You can configure Key 0 as a Voice Call (VCC) or HotLine (HOT) Key.</b>
Key 1	Feature or Auto Dial.
Key 2	Feature or Auto Dial.
Key 3	Feature or Auto Dial.
Key 4	Feature or Auto Dial.
Key 5	Feature or Auto Dial. <b>Note 2: You can configure Keys 1 - 5 with any features that does not require a display (DAG, DWG, DSP and RMK).</b>
#	Deactivate all activated features.
other	Illegal or not defined.  <b>Note 3: The M3901 telephone firmware controls the Volume Control Bar, and the Hold, and Goodbye Keys. Do not configure on the Meridian 1 System.</b> <b>Note 4: Nortel Networks recommends that you do not configure the M3901 Call Center DN.</b>



**Table 4**  
**M3902 key configuration**

Key Number	Description
Key 0	Directory Number line must go on Key 0.
Key 4	TRN (Call Transfer).
Key 5	MWK (Message Waiting).
Key 1-5	Key 1-5 do not configure as: MCN = Multiple Call Non-ringing. MCR = Multiple Call Ringing. PVN = Private Line Non-ringing. PVR = Private Line Ringing. SCN = Single Call Non-ringing. SCR = Single Call Ringing.

**Table 5**  
**M3903 key configuration**

Key Number	Description
Keys 12-15	Blocked.
Key 16	MWK (Message Waiting).
Key 17	TRN (Call Transfer).
Key 18	A03 (3 Party Conference) or the A06 (6 Party Conference).
Key 19	CFW (Call Forward).
Key 20	RG (Ring Again).
Key 21	PRK (Call Park).
Key 22	RNP (Ringing Number Pick-up).
Key 23	Configure as: SCU = Speed Call. SSU = System Speed Call. SCC = Speed Call Controller. SSC = System Speed Call Controller. <b>Note:</b> .not blocked as programmable keys.
Key 24	PRS (Privacy Release).
Key 25	CHG (Charge Account).
Key 26	Calling Party number.
Keys 27-31	NUL.

**Table 6**  
**M3904 key configuration**

Key Number	Description
Keys 12-15	Blocked.
Key 16	MWK (Message Waiting is not a default feature for this key).
Key 17	TRN (Call Transfer).
Key 18	A03 (3 Party Conference) or the A06 (6 Party Conference).
Key 19	CFW (Call Forward).
Key 20	RGA (Ring Again).
Key 21	PRK (Call Park).
Key 22	RNP (Ringing Number Pick-up).
Key 23	<p>Configure as one of the following:</p> <ul style="list-style-type: none"> <li>• SCU = Speed Call.</li> <li>• SSU = System Speed Call.</li> <li>• SCC = Speed Call Controller.</li> <li>• SSC = System Speed Call Controller.</li> </ul> <p><b>Note:</b> The above services are not a default feature for this key. Can use these features on any of the programmable keys.</p>
Key 24	PRS (Privacy Release).
Key 25	CHG (Charge Account).
Key 26	CPN (Calling Party number).
Keys 27-31	NUL.

**Table 7**  
**M3905 key configuration (Part 1 of 2)**

Key Number	Description
Key 5	Server application or NUL.
Key 6	Local application or NUL.
Key 7	Program Key or NUL.
Key 8-11	Configure as one of the following: AAG = Agent Answer. AMG = Answer Emergency Call. ASP = Supervisor call (must have CLS = AGN). EMR = Emergency (must have CLS = AGN). MSB = Make Set Busy. NRD = Not Ready (must have CLS = AGN or SPV). ACNT = Activity Code entry. DWC = Display Waiting Calls (used with supervisor or agent telephones). OBV = Observe agent. RAG = Ring Agent (must have CLS = SPV).
Key 16	MWK (Message Waiting is not a default feature key).
Key 17	TRN (Call Transfer) key.
Key 18	A03 (3 Party Conference) or the A06 (6 Party Conference).
Key 19	CFW (Call Forward).
Key 20	RGA (Ring Again).
Key 21	PRK (Call Park).
Key 22	RNP (Ringing Number Pick-up).
Key 23	Configure as one of the following speed call services: SCU = Speed Call. SSU = System Speed Call. SCC = Speed Call Controller. SSC = System Speed Call Controller.
Key 24	PRS (Privacy Release).

**Table 7**  
**M3905 key configuration (Part 2 of 2)**

Key Number	Description
Key 25	CHG (Charge Account).
Key 26	CPN (Calling Party Number).
Keys 27-31	NUL.

**Table 8**  
**LD 20 - Configure print routine.**

Prompt	Response	Comment
REQ	PRT	Print request.
TYPE	axxxx	Enter appropriate telephone model. axxx = M3901. axxx = M3902. axxx = M3903. axxx = M3904. axxx = M3905.
...	...	...



## Hardware options

Table 9 lists the features and optional hardware available for each telephone

**Table 9**  
**Hardware Features**

Optional hardware available	M3901	M3902	M3903	M3904	M3905
Non-amplified Headset Accessory connected through Headset Jack	NA	NA	Supports	Supports	Supports
Amplified Headset Accessory connected through Handset Jack	Supports	Supports	Supports	Supports	Supports
Handset	Standard	Standard	Standard	Standard	Optional
Accessory Connection Module (ACM)	NA	Supports	Supports	Supports	Supports
Key-based Expansion Module	NA	NA	NA	Supports	Supports
Meridian Communications Adapter (MCA)	NA	Supports	Supports	Supports	Supports
Analog Terminal Adapter (ATA)	NA	Supports	Supports	Supports	Supports
External alerter interface	NA	Supports	Supports	Supports	Supports
<b>Note:</b> X indicates the hardware is available for that model of the M3900 Series Meridian Digital Telephone.					



## **Handset option for the M3905 Call Center Telephone**

The M3905 supports an amplified headset or an optional handset. The handset can be added to the M390 by removing the front plate of the telephone. A handset kit is available for the M3905.

The M3903, M3904 and M3905 have a dedicated headset jack which supports a non-amplified headset. The M3903, M3904 and M3905 have a Headset Fixed Feature Key to turn the Headset on and off.

## **Headset options**

The M3901, M3902, M3904, and M3905 supports an amplified headset when the headset connects to the handset jack.

The M3903, M3904 and M3905 have a dedicated headset jack which supports a non-amplified headset. The M3903, M3904 and M3905 have a Headset Fixed Feature Key to turn the Headset on and off.

## **External Alerter and Recording Interface**

The External Alerter and Recording Interface provides a remote ringer device installed in a location separate from the telephone. The External Alerter and Recording Interface provides access to a standard, off-the-shelf remote ringer, call status relay, audio recorder or visual indicator.

You can program the External Alerter interface to activate a ringer (or light) when the telephone rings or when the telephone is in use (off-hook).

## **Key-based Expansion Module**

The Key-based Expansion Module attaches to the M3904 and M3905 Meridian Digital Telephone. The module provides 22 additional Line/Feature Keys. You can attach a maximum of two Key-based Expansion Modules to the M3904 and M3905.

## **Analog Terminal Adapter**

The Analog Terminal Adapter (ATA) lets you connect an analog device such as a fax machine or modem to your telephone. You can have simultaneous use of the telephone and the analog device. The ATA is available for the M3902, M3903, M3904 and the M3905 models.

## **Meridian Communications Adapter**

The Meridian Communications Adapter (MCA) lets the user connect the telephone to a personal computer or terminal. The MCA allows the telephone to exchange data between your computer and other computers. The M3902, M3903, M3904 and M3905 models support the MCA.



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# Installation

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## To install the M3900 Series Meridian Digital Telephones:

- 1 Complete the wiring and cross-connections (loop power).
- 2 Connect the telephone to the connecting block.
- 3 Place the telephone upright on the desk in the normal operating position.
- 4 Perform the self test and acceptance procedures found in the *Telephone and attendant console installation* (553-3001-215).
- 5 Supply the user with a quick reference guide.

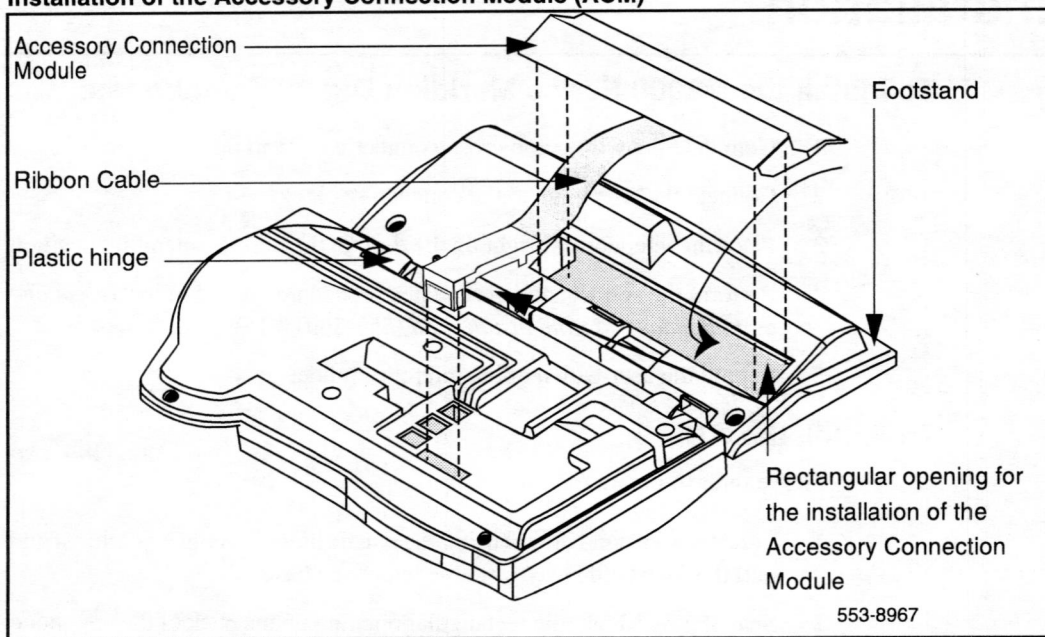
## To install the ACM:

Please refer to Figure 6 on page 30.

- 1 Slide the footstand down (using the plastic hinges) about a quarter of and pull the footstand away from the telephone base.
- 2 Snap the ACM into the rectangular opening on the back of the telephone.
- 3 Connect the ACM cable to the back of the telephone.
- 4 Put the ACM attached ribbon cable into the track running down the back of the telephone base.
- 5 Put the hard plastic cable cover over the ACM ribbon cable.
- 6 Snap the ACM plastic cable cover into place.
- 7 Place the footstand on the hinges.
- 8 Swing the footstand back into place.
- 9 Snap the footstand into a non-movable position.
- 10 Return the telephone to an upright position.

There is a cut out on the base of the footstand which displays the ACM connector ports. When ready to attach an accessory, insert the appropriate cartridge into the port slot. There is one accessory port available on the M3902. There are two accessory ports available on the M3903, M3904 and M3905.

**Figure 6**  
**Installation of the Accessory Connection Module (ACM)**



**Note:** The accessories you attach to the telephone must be compatible. The table "M3900 Series Meridian Digital Telephone accessory compatibility" on page 31 shows the compatibility of the available options.

## Accessory keying

There are two accessory ports on the back of the terminal footstand. Each port can support one cartridge accessory. The ports provide access to a SIDL/SDI ports, a USART port, and a Non-Serial Accessory port.

You cannot use two accessories that require the same port type at the same time. For example, you cannot use two accessories that require a serial port connection at the same time.

The shape and size of the plug in accessory cartridge prevents the user from accidentally connecting incompatible accessories. To check the compatibility of accessories refer to Table 10 which shows the optional accessories and their compatibility.

Make sure you refer to the compatibility chart before you purchase your optional hardware accessories.

**Table 10**  
**M3900 Series Meridian Digital Telephone accessory compatibility**

Accessory	MCA	ATA	DTA	USB	CTIA	DBA	KBA	Headset Port		Headset Port	
								EXT.ART*	HD/S	EXT. ART**	RCDR
<b>MCA</b>	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>ATA</b>	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>DTA</b>	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>USB</b>	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>CTIA</b>	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>DBA</b>	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
<b>KBA</b>	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
<b>EXT.ATR*</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
<b>HD SET</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
<b>EXT.ATR</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
<b>RCDR</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
<p><b>Note 1: Yes = compatible accessories. No = non-compatible accessories.</b></p> <p><b>Note 2: EXT. ATR** = Cartridge External Alerter plugs into ACM.</b></p> <p><b>Note 3: EXT ATR* = External Alerter plugs into Headset Jack.</b></p>											

## Telephone positions

Your M3903, M3904 and M3905 Meridian Digital Telephones have ten different height selections for the desktop positions. To change the telephone position:

- 1      Press the bar at the top back side of the telephone.
- 2      With the position bar pressed in, raise or lower the telephone to the desired angle or height.
- 3      Release the bar to lock the telephone in the desired position.

*Note:* The M3903 and M3904 can be wall mounted.

The M3901 and M3902 Meridian digital Telephones have three different angled height desktop positions. To change the telephone angle:

- 1      Move the top of the footstand away from the telephone base (it has a snap connection).
- 2      Place the footstand in the desired position and snap the top of the footstand back into place.



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## Environmental and safety considerations

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### Temperature and humidity

<b>Operating state:</b>	
Temperature range	0° to 50°C (32° to 104°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity limited to 53 mbar of water vapor pressure.

<b>Storage:</b>	
Temperature range	–50° to 70°C (–58° to 158°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity limited to 53 mbar of water vapor pressure.

## Line engineering

The M3900 Series Meridian Digital Telephones use twisted pair wiring on transmission lines determined by the rules in *Digital telephone line engineering* (553-2201-180). The maximum acceptable loop length is 1067 m. (3500 ft), assuming 24 AWG (0.5 mm) standard twisted wire with no bridge taps. A 15.5 dB loss at 256 kHz defines the loop length limit. Longer lengths are possible, depending on the wire's gauge and insulation.

### CAUTION

**Use only the line cord provided with the telephone. A line cord designed for another telephone can cause damage to the equipment.**

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## List of Acronyms

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**ACD**

Automatic Call Distribution

**ACM**

Accessory Connection Module

**ADO**

Asynchronous Data Option

**ATA**

Analogue Terminal Adapter

**COS**

Class of Service

**CCOS**

Controlled Class of Service

**CPM**

Call Progress Monitor

**CPND**

Calling Party Name Display

**DCE**

Data Communications Equipment

**DLC**

Digital Line Card

<b>DN</b>	Directory Number
<b>EIA</b>	Electronic Industries Association
<b>FCC</b>	Federal Communications Commission
<b>IDF</b>	Intermediate Distribution Frame
<b>LCD</b>	Liquid Crystal Display
<b>LED</b>	Light Emitting Diode (lamp)
<b>MDF</b>	Main Distribution Frame
<b>MCA</b>	Meridian Communications Adapter
<b>MPA</b>	Meridian Communications Adapter
<b>TN</b>	Terminal Number



# **M3900 Series**

## **Meridian Digital Telephones**

### **Description, Installation and Administration**

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